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ABSTRACT

Testimony is presented on H.R. 4904, "Technology-Related Assistance for Individuals with Disabilities Act of 1988." The legislation allows states to apply for grants to be used to develop and implement a consumer-responsive statewide program of technology-related assistance. States may develop the program by providing assistive technology devices and services, by developing an information dissemination system, by establishing or enhancing training and technical assistance, or by designing public awareness projects. Statements, letters, and supplemental materials are included from: (1) two Representatives in Congress, Steve Bartlett and James Jeffords; (2) representatives of government agencies, including the Minnesota Governor's Initiative on Technology for People with Disabilities and the Rehabilitation Services Administration; (3) representatives from private agencies, including Coalition on Technology and Disability, Apple Computer, Inc., American Society of Mechanical Engineers, and Council for Exceptional Children; and (4) a private citizen with quadriplegia. (JDD)

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H.R. 4904, TECHNOLOGY-RELATED ASSISTANCE FOR INDIVIDUALS WITH DISABILITIES ACT OF 1988

ED307797

HEARING

BEFORE THE

SUBCOMMITTEE ON SELECT EDUCATION

OF THE

COMMITTEE ON EDUCATION AND LABOR HOUSE OF REPRESENTATIVES

ONE HUNDREDTH CONGRESS

SECOND SESSION

HEARING HELD IN WASHINGTON, DC, JUNE 30, 1988

Serial No. 100-103

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H.R. 4904, TECHNOLOGY-RELATED ASSISTANCE FOR INDIVIDUALS WITH DISABILITIES ACT OF 1988

THURSDAY, JUNE 30, 1988

U.S. HOUSE OF REPRESENTATIVES,
COMMITTEE ON EDUCATION AND LABOR,
SUBCOMMITTEE ON SELECT EDUCATION,
Washington, DC.

The Subcommittee met, pursuant to notice, at 9:05 a.m., in room 2257, Rayburn Office Building, Hon. Major Owens [chairman of the subcommittee] presiding.

Members present: Representatives Owens, Bartlett, and Jeffords.

Staff present: Maria Cuprill, Patricia Laird, Jillian Evans, Gary Granofsky and Sally Lovejoy.

Mr. OWENS. This hearing of the subcommittee will come to order.

We are here today to hear testimony related to H.R. 4904, which is the "Technology-Related Assistance for Individuals with Disabilities Act of 1988."

There are 35 million Americans with disabilities who are unable to perform many ordinary tasks that those of us who are not disabled take for granted, such as independently reading a book, turning on a light, or communicating a simple need. This frustration is augmented by the fact that while there may be devices to help these individuals, they may lack knowledge about them, or may not have the money to buy them.

The technological revolution has benefited and changed our lives and our society, yet it seems that the population which could best utilize this technology has been unable to enjoy the products of our progress. The "Technology-Related Assistance for Individuals with Disabilities Act of 1988" will begin to remedy these inequities.

This innovative legislation will allow the States to apply for grants which will be used to develop and implement a consumer-responsive Statewide program of technology-related assistance. A State may decide to accomplish such a program by providing assistive technology devices and services, by developing an information dissemination system, by establishing or enhancing training and technical assistance, and by designing public awareness projects. The strength of this program is in its flexibility to provide assistance through any or all of these suggested activities or any others that may serve the identified technological needs of the disabled citizens of their State.

The private and public sectors have played a critical role in the development and expansion of assistive technological devices. Their

part in creating and designing new devices and products has not been overlooked in this legislation. A State may use its grant to support the establishment or continuation of partnerships and cooperative initiatives which are already in place between the public and private sector.

The student and faculty demonstrations at Gallaudet University earlier this year called world attention to the fact that too many policy-makers and employers still treat Americans with disabilities as if they were incapable of taking care of themselves and governing their own lives. This assistive technological devices and services legislation is a major vehicle for broadening the Americans with Disabilities Empowerment Movement, of which the Gallaudet demonstrations were a vital part. We hope this legislation will be the first step toward a world in which disabled Americans will no longer be held back by their impairments or by wrongly held assumptions that they have too many limitations to be able to function as capably as anyone else in our society.

The "Technology-Related Assistance For Individuals With Disabilities Act of 1988" is the result of a bipartisan effort in both the House and Senate in partnership with the disability community. It is not often that a bill receives bipartisan and bicameral support. I would like to congratulate all those individuals who worked so diligently in developing this legislation.

I yield to Mr. Jeffords, the sponsor of this legislation for an opening statement.

Mr. JEFFORDS. Mr. Chairman, I thank you for holding this hearing and for the tremendous help from your staff and from all of the others involved in developing this bill and facilitating its simultaneous introduction in both the House and Senate on June 23, 1988. I also want to thank my colleague, Mr. Bartlett, for his substantial participation in the drafting of the bill. He made many excellent suggestions and assisted in securing critical support for the legislation.

I believe that all of us here anticipate expeditious consideration and passage of H.R. 4904 in the House, and its companion bill, S. 2561, in the Senate this summer. There are several reasons for this.

First, this legislation addresses a significant need of many individuals with disabilities—knowledge of and access to assistive technological devices and services. Second, the bill recognizes the value and promotes the creation of consumer-responsive Statewide programs of technology-related assistance for disabled individuals of all ages. Third, the bill once enacted, will lead to greater integration of, participation by, and contributions from individuals with disabilities in all of the activities of daily living. Fourth, this legislation will increase the independence of individuals with disabilities through assistive technological devices and services and will also reduce the costs incurred by such individuals, their families, and society. Fifth, this legislation reflects a broad consensus. Many groups, organizations, members in both Houses of Congress, and representatives of the Department of Education participated in the crafting of this bill. Because our goals made sense in both human and economic terms, I am confident that we will be able to sustain

our consensus, secure enactment, and see immediate efforts toward implementation.

I am looking forward to the testimony of Sue Suter, Commissioner of the Rehabilitation Services Administration, Michael Morris on behalf of the Coalition on Technology and Disability, and Andrew Batavia on behalf of the individuals with disabilities.

Although we must wait to realize the full potential and effects of this legislation, I believe very strongly that we have made the right choices in crafting it. We have invested in people with untapped capabilities, we have challenged States to target resources through increased coordination, and we have offered Federal dollars as catalysts for needed change.

Thank you, Mr. Chairman.

[The prepared statement of Hon. James M. Jeffords follows:]

OPENING STATEMENT OF JAMES M. JEFFORDS

Mr. Chairman, I would like to take this opportunity to thank you, not only for scheduling this hearing on our bill, the Technology-Related Assistance for Individuals With Disabilities Act of 1988, H.R. 4904, but also to commend you and your staff for your efforts and assistance in developing the bill and facilitating its simultaneous introduction in the House and Senate on June 23, 1988. I would also like to publically thank my colleague, Mr. Bartlett for his substantial participation in drafting the bill and in securing critical support for the legislation. I believe all of us here anticipate expeditious consideration and passage of H.R. 4904 in the House and its companion bill, S. 2561, in the Senate this summer. There are several reasons for this.

First, this legislation addresses a significant need of many individuals with disabilities—knowledge of and access to assistive technology devices and services.

Second, the bill recognizes the value and promotes the creation of consumer-responsive statewide programs of technology-related assistance for individuals with disabilities of all ages.

Third, H.R. 4904, when enacted, will lead to greater integration of, participation by, and contributions from individuals with disabilities in all activities of daily living.

Fourth, the legislation, by increasing the independence of individuals with disabilities through assistive technology devices and services, will reduce the costs incurred by such individuals, their families, and society.

Fifth, this legislation reflects a broad consensus. Many groups, organizations, members in both Houses, and representatives of the Department of Education participated in the crafting of this bill.

Because our goals made sense in both human and economic terms, I am confidant that we will be able to sustain our consensus, secure enactment, and see immediate efforts toward implementation. I am looking forward to the testimony of Sue Suter, Commissioner of the Rehabilitation Services Administration, Michael Morris on behalf of the Coalition on Technology and Disability, and Andrew Batavia on behalf of individuals with disabilities.

Although we must wait to realize the full potential and effects of this legislation, I believe strongly that we have made the right choices in crafting it. We have invested in people with untapped capabilities; we have challenged States to target resources through increased coordination; and we have offered Federal dollars as catalysts for needed change.

Thank you.

Mr. OWENS. Mr. Bartlett.

Mr. BARTLETT. Thank you, Mr. Chairman.

I do appreciate these hearings on H.R. 4904, "The Technology-Related Assistance for Individuals with Disabilities Act of 1988." I particularly appreciate these hearings, given the fact that this legislation has now developed a consensus status. It ought to be on a fast track for approval during this session. Rarely do we find an issue that members, both Democrat and Republican, along with a majori-

ty of groups within the disability community, can support as we find in this bill.

The legislation will provide individuals with disabilities increased employment and educational opportunities and will allow them to become more independent. H.R. 4904 makes that small investment which will bring in a large return, both to society as a whole, and to a large number of individuals. What I am looking forward to in these hearings is an excellent set of witnesses who can help this subcommittee pick apart this legislation—it has been taken apart and put back together already, as everyone knows—but this subcommittee hearing represents our last opportunity for some finishing touches. So I do implore the witnesses to be candid if they see any difficulties in this legislation from their point of view. If a subsequent witness notes a difficulty that someone else mentioned and believes differently about it, I would appreciate hearing that side of it also.

In essence, because this legislation is on a fast track, this is the hearing in which we need to get all the final comments and suggestions for improvement out on the table, so that the subcommittee, then the full committee, and then the Congress as a whole can help to pass the final legislation.

Let me make one additional comment. I have to tell you how proud I am, both of Jim Jeffords and of Chairman Major Owens, for their commitment to this issue that has been displayed from the very beginning. We recognized from the first that we only have one shot at a major technology bill for assistive devices for disabled persons. We also recognized from the beginning that there are a lot of ways to do it wrong, that could result in a new Federal program with little or no impact on the lives of disabled persons. It is easy in the Federal Government to simply spend money and not see any consequences. The Members of Congress on this subcommittee determined that we were not going to do that, and that we were going to make sure that when we take our one shot at setting up technology legislation we want to make sure that we do it right—right being measured by its impact on individual lives. That commitment has been here from the very beginning and I think we have a piece of legislation that we can all be very proud of. Again, I invite the witnesses to tell us if there are any additional improvements that they think we ought to make so that the subcommittee members can weigh those comments and make their determinations.

Mr. Chairman, I ask unanimous consent that my prepared statement be entered into the record of these proceedings.

Mr. OWENS. Your prepared statement will be inserted immediately following your oral presentation.

Mr. OWENS. Our panel of witnesses consists of Mr. Andrew Batavia, who is a consumer, Ms. Susan Suter, Commissioner of Rehabilitation Services Administration, U.S. Department of Education, and Mr. Michael Morris, on behalf of the Coalition of Technology and Disability.

Please be seated, and Mr. Batavia, you may begin.

STATEMENT OF ANDREW BATAVIA, CONSUMER

Mr. BATAVIA. Mr. Chairman and members of the Subcommittee, I thank you for the opportunity to testify on this very important and well-drafted bill.

My name is Andrew Batavia. I am a C-2-3 quadriplegic because approximately 15 years ago while in the back seat of a car in New York, I went through the front windshield during a collision and broke my neck between the second and third cervical vertebrae. As a result, I am paralyzed from the shoulders, having no use of my arms, hands, or legs.

Since the time of my accident, I have received a Bachelor's degree from the University of California, a Master's degree in Health Services Research from Stanford Medical School, and a Juris Doctorate degree from Harvard Law School. I have worked for 2 years as an attorney for the Health Care Financing Administration. I have received an honorary research fellowship from the Department of Education to study rehabilitation finance policy. I am in charge of Health Services Research at the National Rehabilitation Hospital in Washington, D.C., and just last week, I received an adjunct assistant professorship from Georgetown Medical School.

The reason that I relate these accomplishments to you is that I could not have accomplished what I have without the use of technologies that I have been using and that have been evolving in my life over the past 15 years.

I use this chin-controlled wheelchair which has a recliner mechanism and I use this mouth-stick to type on a computer. I have an environmental control system at home that helps me work the lights and appliances and I use reading stands to turn pages. My work site at the National Rehabilitation Hospital is equipped in the same way.

I have held the opinion for a long time that technology holds the greatest promise for the enhanced independence and employability of disabled persons, and I am very grateful for the opportunity to have had these technologies available to me over the last 15 years. It has been very interesting to me during those years to look at the evolution of these technologies because they really have been evolving very rapidly.

When I first entered the University of California in 1975, I had a simple IBM Selectric typewriter and I used my mouth-stick to operate it. I used to have to type 60 page papers, and sometimes I would type that 60 page paper using the mouth-stick to make as many as three drafts. By the end of the night I would sometimes have spent as much as 12 hours at a time typing with my mouth-stick. Since the development of computers I don't have to do the additional drafts any more, although I still have to use my mouth-stick. Eventually, once voice-activation is perfected, I won't need the mouth-stick at all. It will simply be a matter of talking to the computer and having it input my text on to the screen. This is very exciting. It has enhanced my productivity enormously, and I think it can do the same for the rest of the disabled population.

I would like to speak not only as a consumer, but also as a researcher in the field of medical rehabilitation since I am in charge

of Health Services Research at the National Rehabilitation Hospital. There are two major issues concerning these assistive devices that I think this bill handles very well.

The first is the issue of abandonment of technologies. That relates to the fact that many disabled people—particularly during the early years of their disability—are not familiar with their technology needs. Consequently they acquire expensive technology, subsequently learn that because they were not familiar with their needs that the technology they purchased did not adequately meet their needs, and they ended up abandoning their technology. I believe that as a result of this bill, consumers are going to have an opportunity to look at and hopefully to test drive these technologies in order to determine whether they are appropriate for them so that we don't have to have the frustration and waste that has occurred thus far.

The other major issue that I am interested in is financing. I think that the most important determinate of access, quality, and cost of assistive devices is the way in which those devices are financed. We have a terribly fragmented financing system for health care in this country.

In a hearing on a related bill by Senator Harkin in the Senate, I commented extensively on potential modifications to the current system that could help increase access through enhanced financing. If the Subcommittee would like that to be added to the record, I believe that your staff has a copy of that. I think that it is terribly important that we address the financing issue, and I am glad that this bill addresses a study on the financing of these devices through the National Council.

Finally, I want to say that I think that this bill has been extremely well drafted and that it is extremely comprehensive. My only concern with the bill is that I believe that funding for the individual grants may be somewhat sparse, leading to possibly centralized centers in States, which may not give adequate access to those disabled people who are not able to transport themselves to these centers.

The other minor concern that I have is that the bill talks about monies under the grants being available for the actual provision of technologies. I do not think that is necessarily space appropriate since the funding is rather sparse in the first place. It seems that it would be more cost-effective to be focusing on the dissemination of information rather than the provision of these devices. I think that it is very important that we address the provision and repair of the devices through modification of the current financing system. Thank you very much for the opportunity to be here this morning.

[The prepared statement of Andrew I. Batavia follows:]

NRH
NATIONAL REHABILITATION HOSPITAL

Statement on

THE TECHNOLOGY-RELATED ASSISTANCE FOR INDIVIDUALS WITH DISABILITIES ACT OF 1988

Before the

SUBCOMMITTEE ON SELECT EDUCATION

COMMITTEE ON EDUCATION AND LABOR

U.S. HOUSE OF REPRESENTATIVES

Presented by

ANDREW I. BATAVIA, J.D., M.S.

PROGRAM MANAGER FOR HEALTH SERVICES RESEARCH
NATIONAL REHABILITATION HOSPITAL
WASHINGTON, D.C.

ADJUNCT ASSISTANT PROFESSOR
DEPARTMENT OF COMMUNITY AND FAMILY MEDICINE
GEORGETOWN UNIVERSITY SCHOOL OF MEDICINE

June 30, 1988

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Mr. Chairman and Members of the Subcommittee on Select Education:

I am a C2-3 quadriplegic. On August 12, 1973, my spinal cord was severed between my second and third cervical vertebrae as a result of an auto accident in upstate New York. I was thrown by the impact of the collision from the back seat of the car through the front windshield. Consequently, since 1973 I have been paralyzed from my shoulders and below, and I have no voluntary movement or sensation in my arms, hands or legs. It should be noted that the driver responsible for my injury was reported to be under the influence of drugs and alcohol. In addition, the back seat of the car was not equipped with seatbelts. In a real sense, my disability is directly related to the use, or rather the misuse, of technology.

I am now in charge of Health Services Research at the National Rehabilitation Hospital in Washington, D.C. I have recently received an appointment as an Adjunct Assistant Professor from Georgetown University School of Medicine. Since my injury in 1973, I received a B.S. with honors in Economics and Sociology from the University of California at Riverside, an M.S. in Health Services Research from Stanford Medical School, and a J.D. from Harvard Law School. In addition, I have served as an attorney for the U.S. Health Care Financing Administration, DHHS, and I received the Mary E. Switzer Distinguished Research Fellowship in Medical Rehabilitation Finance

from NIDRR, Department of Education. I relate these accomplishments, of which I am proud, because they are also, in large part, attributable to the application of technology.

Just as I would probably not require the use of a wheelchair if the car responsible for my injury was equipped with appropriate safety devices, I would probably not have been able to achieve that which I have accomplished without the use of my chin-control wheelchair, reading stands, and typing devices. When I first arrived at the University of California in 1975, I typed all of my papers using an I.B.M. Selectric Typewriter and a mouthstick (a metal stick with plastic on both ends, one end to hold in my teeth and the other end to hit the keyboard). I would often have to type a first draft of a 60 page paper, then start typing a second draft from the beginning based on the first draft, and to finally type a third draft (for a total of 180 typed pages).

I am now able to use a powerful microcomputer with two 20 megabyte hard disks and a wordprocessing program that allows me to avoid having to do multiple drafts of a document. I am currently writing three books on the topic of medical rehabilitation financing which would have taken me ten times as long (and ten times the effort) without this impressive technology. In the next five years, I look forward to the further development and refinement of voice-activated wordprocessing, which will eventually allow me to type without the use of a mouthstick. I will simply talk to the computer, and the

computer will transform my words to print on the screen. This technology will also help me to control my environment (e.g., turn on lights and appliances, etc.).

Clearly, technology has dramatically enhanced my employability, productivity, and independence. As a disabled individual, I have personally experienced the improvements in technology over the past 15 years, and I firmly believe that advances in technology hold the greatest promise for the increased independence of disabled persons. For this reason, I am very pleased that the "Technology-Related Assistance for Individuals With Disabilities Act of 1988" has been proposed, and is being actively considered by your Subcommittee. The bill has been drafted thoughtfully, and its approach is very comprehensive. It appears to address all of the major issues concerning the national dissemination of assistive devices for disabled persons. In this regard, I would like to make two comments.

First, an important issue in the area of assistive devices for disabled persons concerns the abandonment of technological devices. That is, there is anecdotal evidence of the following pattern for certain devices: disabled persons acquire the device, attempt to incorporate it into their lives, determine that it is not satisfactory and cannot be adequately modified to meet their needs, and finally discard the devices.[1] One possible cause of the problem

[1] The National Rehabilitation Hospital has recently been awarded a Rehabilitation Engineering Center (REC) in the area of Technology Evaluation from the National Institute on Disability and

of technology abandonment may be that the recently disabled person is not adequately aware of his or her own technological needs until he or she has an opportunity to test devices. The proposed bill would help to address the problem of abandonment through the dissemination of information on technologies. Hopefully, some of the Technology centers or demonstration projects under the bill will permit greater testing of potentially beneficial devices by disabled persons.

Second, I believe that the most important determinant of the level of access, quality, and cost of assistive technologies for disabled persons is the way in which such devices are financed. As I indicated in a letter to Senator Tom Harkin on his related assistive devices bill, the current system of public and private sector financing for technologies needed by persons with disabilities is very inadequate. For this reason, I am pleased that the proposed bill provides for a study to be conducted by the National Council on the Handicapped Disability to study the financing issues. I would be glad to offer my assistance and my expertise in the area of financing of services for disabled persons to the Council when it conducts this important study.

It is my hope, as a disabled individual who has personally benefited from the positive application of modern technology and as a researcher who studies these issues that this bill will be enacted

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Rehabilitation Research (NIDRR), and is studying the issue of technology abandonment as part of its REC.

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into law. I believe that the "Technology-Related Assistance for Individuals With Disabilities Act of 1988" will make assistive devices more understandable, accessible, and affordable to persons with disabilities. Its long-term effect will be to enhance the employability, productivity, and independence of many disabled persons, and to thereby improve the quality of their lives.

May 23, 1988

Honorable Tom Harkin
Chairman
Subcommittee on the Handicapped
113 Hart Senate Office Building
Washington, D.C. 20510

Dear Senator Harkin,

It was an honor meeting you at the hearings on assistive devices for disabled persons last week. I was very impressed with the obvious commitment of you and your staff in addressing the important issues concerning the dissemination of rehabilitation technologies to persons with disabilities. As I indicated to you at that time, I will be glad to do all that I can to assist you in developing the strongest bill possible.

I have been asked by Mr. Silverstein of your staff to provide written comments on the financing of assistive devices. Please note that the following comments do not necessarily represent the views of the National Rehabilitation Hospital, where I serve as Program Manager for Health Services Research. I hope that you will accept them as the views of one physically disabled researcher who specializes in the financing of medical rehabilitation, rehabilitation engineering, and other services for the disabled population. I have attached my resume to indicate my credentials to comment on these issues.

The following comments relate to the financing of devices that have already been designed, developed, and manufactured, but still need to be provided, learned, and maintained by disabled persons. The issues that I address, which are most closely related to your proposed bill, are somewhat different than the financing issues concerning the design, development and manufacturing of assistive devices, including so-called "orphan technologies" that have very small potential markets. I would be glad to discuss those other issues with your staff at a later time.

The current health care financing "system" in this country does not adequately provide access to affordable assistive devices for disabled persons. There are several reasons for this lack of access, some of which are not subject to ready amelioration without fundamental changes in the system. Recognizing that

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fundamental changes in the health care financing system are unlikely in the current political and economic environment, the following comments address current impediments to the wide dissemination of assistive devices under existing programs, and long- and short-term approaches to addressing these impediments.

The current system of health care financing is highly fragmented, consisting of a multitude of public and private sector insurance programs with a variety of different eligibility rules, coverage rules, and payment mechanisms. Medicare, Medicaid and the VA programs have complex eligibility rules that often preclude eligibility for disabled persons. Private sector insurance programs are primarily employment-based, and coverage can be lost during times of illness when employment and financial resources are lost. Because these programs are poorly coordinated, disabled persons requiring assistive devices often "fall between the cracks of the system." Even if a disabled person is covered under a program, few programs cover assistive devices and their repair.

The private sector insurance plans, in particular, are unlikely to provide adequate coverage of assistive devices. This is because private sector plans, such as Blue Cross/Blue Shield, other health insurance plans, and HMOs, are in competition with each other to provide the most attractive package of services and premiums to their general membership. By covering a broad range of assistive devices designed for disabled persons, a plan is likely to attract a large number of disabled enrollees. However, because disabled enrollees tend to be much more intensive users of health care services than the general population, and because the assistive devices and other services needed by disabled persons are often very expensive, the plan that enrolls a large number of disabled persons will incur higher costs than its competitors and thus become less competitive. For this reason, private sector insurers have a strong incentive not to cover assistive devices and other services for disabled persons.

The tendency for a private insurance plan or HMO to attempt to discourage high risk persons from enrolling is often referred to as "preferred risk selection." The tendency for low risk persons to avoid enrolling in plans with benefits they do not currently need (and thus high premiums) is called "adverse selection." For example, HMOs very seldom cover assistive devices, and it is often alleged that they have this policy to discourage disabled persons from enrolling. They

instead tend to cover services that will be attractive to a young, healthy, non-disabled population such as "wellness care" and "prenatal care."

Issues concerning our fragmented financing system, preferred risk selection, and adverse selection are best addressed in a systematic manner through a comprehensive financing approach. Ideally, this would mean the development of a well coordinated national health insurance program devised to ensure efficiency through a comprehensive organizational scheme and decentralized provision of services. Such a system has been designed by Professor Enthoven at Stanford, and has been incorporated, in part, into a number of Congressional bills. However, recognizing that development and implementation of such a system is probably not currently feasible politically, it is necessary to determine what incremental steps to take to modify the current system.

The following are several suggestions concerning modifications to the current financing system:

1. Medicare - The Medicare program currently covers assistive devices that are "medically necessary," such as wheelchairs and braces. HCFA has tended to interpret this statutory term narrowly to disallow certain devices that could be considered medical necessities under a broader interpretation. For example, it does not cover communication aids and environmental control systems. To address this problem, either the definition of "medically necessary" under the Medicare program could be expanded or an alternative terminology relating to the disabled population such as the term "functionally necessary" could be added. This term would, of course, have to be carefully defined.

   In addition, Medicare does not explicitly cover rehabilitation engineering services that are necessary to assess, develop, and/or adapt assistive devices to the needs of the individual disabled person. Without such services provided by a trained rehabilitation engineer, many devices that have been developed would be virtually useless to many disabled persons. Rehabilitation engineering services could be explicitly covered under the program.

2. Medicaid - The provision of assistive devices is currently an optional service under the federal Medicaid program. Therefore, states are not

required to provide and repair assistive devices under their state Medicaid plans, and most have chosen either not to cover such services or to use a narrow interpretation of "medically necessary" devices, similar to the Medicare program. As with the Medicare program, state Medicaid programs could be required to pay for assistive devices, the adaptation of assistive devices by rehabilitation engineers, the training of disabled persons on the devices, and the repair of such devices.

3. Veterans Administration Programs - The V.A. has generally provided an excellent example of what the federal government can achieve in terms of providing assistive devices to disabled persons, at least with respect to the basic needs of persons with service-connected disabilities (Category A Veterans). It would be valuable to examine whether Category B and C veterans with non-service-related disabilities are similarly receiving the assistive devices and related services they need. It would also be valuable to examine the mechanisms by which newly developed devices are provided by the V.A. system, and whether such new technologies are being adequately incorporated into the lives of disabled veterans.

4. Vocational Rehabilitation Agencies - State V.R.A.s that receive funding under the federal Rehabilitation Act pay for some assistive devices that are likely to enhance the employment capability of potentially employable disabled persons. However, such agencies are typically poorly funded, and little money is available for the provision, training, adaptation, and repair of assistive devices. Additional funds under the Rehabilitation Act could be specifically set aside for these purposes.

5. Private Sector Health Insurers and HMOs - As indicated above, the decision of whether private sector health insurers and HMOs will cover assistive devices is complicated by issues of preferred risk selection and adverse selection. Health insurers and HMOs are currently deterred from covering such devices and related services for fear that they will become less economically competitive by doing so. It is therefore necessary to create a "more level playing field" for health insurers such as Blue Cross/Blue Shield that pay for (at least some) assistive devices. This could be done most directly and easily by mandating the

provision of assistive devices. However, given the current political controversy over mandating health care benefits, it may be preferable to simply subsidize (possibly through the tax laws) insurers that provide such coverage.

6. The Disabled Individual (under private health insurance) - Even if a disabled person has an insurance policy that covers certain assistive devices, almost all policies have significant deductibles and copayments that are the financial responsibility of the enrollee. As a personal example, my electric wheelchair that had to be custom-adapted with a chin control and a recliner mechanism cost $10,000. Blue Cross/Blue Shield, which requires a co-payment of 20% on durable medical equipment, paid approximately $8,000 for the wheelchair, leaving me with a bill of approximately $2,000 above the annual $200 deductible. It should be noted that Blue Cross/Blue Shield is one of the most generous private sector programs available in terms of assistive devices that are medically necessary. Fortunately, I am in a position to pay for my share of such equipment (although it is financially burdensome), but many disabled persons are not.

7. The Disabled Individual (under federal tax law) - The recent Tax Reform Act increased the percentage of income above which medical costs may be deducted. This modification has had a disproportionate effect on persons with disabilities who tend to have high medically-related costs, including the costs of health care and assistive devices (if not covered by insurance), the copayments associated with such services (if they are covered), and the high costs of personal attendant care. There should be some offset for disabled persons to reduce the burden imposed by the tax law. One possibility for such an offset is the creation of a tax credit for assistive devices. Alternatively, the current limitation on the deductibility of medical costs could be waived with regard to assistive devices, their adaptation, and their repair.

8. The Disabled Individual (under SSI and Medicaid) - The above treatment of disabled persons applies primarily to disabled persons who are employed and have private insurance coverage. Disabled persons who are potentially eligible for SSI and Medicaid may compromise their eligibility if they accumulate

resources above that allowed under those programs. This limit prevents the individual from accumulating enough money to purchase the expensive devices (that are not covered by Medicaid) that could assist the individual to become more self-sufficient and employable. This problem could be addressed through a provision in the SSI and Medicaid eligibility rules that would permit the creation by SSI and Medicaid recipients of "assistive device trust funds" that would be exempt from the resource eligibility limits.

9. For-Profit Employers - Employers in the for-profit sector could be encouraged to employ disabled persons and to provide them with assistive devices through further modification of the tax laws. The current tax credit available for worksite accessibility could be expanded in amount and directed explicitly to assistive devices. For example, a one time credit to employers of a maximum of $10,000 per disabled employee could be applied, with the added condition that the device would become the property of the disabled person if employment terminates. A lifetime maximum per disabled person might be necessary to prevent abuse of this credit by disabled persons.

10. Non-Profit Employers - Employers in the not-for-profit sector could be encouraged to employ disabled persons and to provide them with assistive devices through federal grants for assistive devices. Such grants could be administered through the Rehabilitation Act, and could use cost-sharing arrangements with State government, local government, and/or the non-profit employer.

Several themes run throughout the above policy suggestions. First, any policy must define carefully what it means by assistive devices, since assistive devices encompass a very broad scope of technologies that benefit disabled persons. Many of these technologies are not "medical" or "medically necessary" according to the narrow definitions applied by the IRS, Medicare and Medicaid, but are nonetheless essential to reducing the functional limitations of disabled persons. Thus, the proposed bill should consider broadening the definitions used by these programs to incorporate the concept of "reduction of functional limitation."

Second, policies that simply finance the purchase of assistive devices for disabled persons are not sufficient. The policies must also address the

financing of rehabilitation engineering services necessary to assess the needs of disabled persons and to adapt the technologies to those needs; the financing of the training of disabled person to use the assistive devices; and the financing of the repair and maintenance of assistive devices. Without such services, the devices are likely to be provided inappropriately, used inappropriately, and/or abandoned.

Third, the various payors and programs addressed above should be coordinated to the extent possible to prevent the duplication of expenditures. It is necessary to determine which program is primarily responsible for the financing of the assistive devices for any particular individual, and the relative obligations of other programs. Private sector programs, in particular, should be discouraged from imposing the full obligation on the public sector and from engaging in preferred risk selection.

Fourth, since the financing of assistive devices and related services through this bill would enhance their effective demand, and thereby increase their cost, it will be necessary to include provisions in the bill to contain these costs. This can be achieved most effectively by using the federal government's leverage through its purchasing power to buy these devices and to enhance the competition among suppliers and providers in furnishing these devices. Eventually, it will also be valuable to address the effects of potential legal liability (and liability insurance) on the costs of assistive devices. This issue is currently being studied through grants by NIDRR, Department of Education.

Finally, in response to your request at the hearings for documentation of the cost-effectiveness of assistive devices, I am not aware of any such studies that have been conducted. However, substantial anecdotal evidence taken from the experience of disabled persons strongly suggests significant government savings and other economic benefits resulting from the use of assistive devices. From my own perspective, I doubt that I would have been able to receive a J.D. from Harvard Law School, a M.S. from Stanford Medical School, and a B.S. from the University of California without the assistance of my electric wheelchair, reading stands, mouthsticks, and adapted typewriter. I am now able to pursue my career in rehabilitation research (and to write this letter) with the assistance of an adapted computer and a mouthstick. Formal cost-effectiveness studies of assistive devices are badly needed, and could

be encouraged through the Rehabilitation Act.

If I can be of further assistance to you and your staff, please do not hesitate to contact me at (202) 269-8373 (work) or (202) 863-2783 (home). In addition, I would be happy to demonstrate to you how I have adapted my home in Southwest Washington and my office at Capitol Hill Hospital to meet the needs associated with my physical disability. I strongly support your efforts in this important area, and I hope that the bill is well received by Congress.

Sincerely,

Drew Batavia, J.D., M.S.
Program Manager for
Health Services Research

cc: Gerben DeJong, Ph.D.
Edward A. Eckenhoff, M.H.A.
Guy S. Hamner, B.S.E.E., P.E.
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James Reswick, Sc.D.
Lawrence Scadden, Ph.D.
Virginia W. Stern, M.A.
Steven C. White, Ph.D.

Mr. OWENS. Thank you Mr. Batavia.
Commissioner Suter?

STATEMENT OF SUSAN S. SUTER, COMMISSIONER, REHABILITATION SERVICES ADMINISTRATION, U.S. DEPARTMENT OF EDUCATION

Ms. SUTER. Mr. Chairman and members of the Subcommittee, I am pleased to represent the Assistant Secretary, Office of Special Education and Rehabilitative Services in my testimony on assistive technology for people with disabilities. I am also very happy to say that the Administration supports this bill. We are reviewing it at the present time and we may make minor suggestions for improvements.

OSERS is very interested in assistive technology. It plays a very important role in our research programs for the education of children with disabilities and in our programs for the rehabilitation of adults. The kinds of devices used by people with disabilities has greatly increased during the past few years and their usefulness has increased educational opportunities, vocational performance, and quality of life. They increase mobility and environmental control which in turn improves opportunities for people with disabilities to become more independent and less reliant upon others.

Technological aids need not be expensive or complicated. Many are simple inexpensive devices that can modify or accommodate the work or home environment. Although these aids may be rather simple, many times the evaluation of a person's need for technology and the determination of an appropriate and cost-effective technological solution might be very complex. This complexity is due to a fragmented delivery system in which the purchase, delivery, and information about these technologies are not integrated into a mutually reinforcing and complimentary unit. For example, medical providers may prescribe a device which is oriented toward satisfying the objective of the medical care system, often with no consideration given to an individual's vocational capabilities. Funding requirements may result in incomplete or inappropriate services being delivered. Fragmentation also results when pieces of technological equipment are purchased separately, often resulting in systems which do not work together. The net result may be the additional expense of purchasing technology that is compatible. A lack of funding sources and information about these sources exists, as does a lack of trained personnel who are familiar with the various programs and their requirements. These deficiencies result when rehabilitation engineering out-paces the amount of commonly available knowledge about technological solutions, evaluations, and funding.

Last year, Assistant Secretary Madeleine Will formed a task force on rehabilitation engineering. The task force has been very helpful in disseminating information, conducting a survey on the rehabilitation engineering delivery system, and preparing discussion papers on the sources of financing technology and service systems and on the subject of how State vocational rehabilitation agencies are providing rehabilitation engineering services.

OSERS supports activities in technology. Under the vocational rehabilitation program, State agencies provide aids and devices for people with disabilities to assist them in employment. Agencies are now required to provide rehabilitation engineering services, if appropriate, to all clients. Special Education supports project grants to further the use of new technology to assist in educating and providing related services to children with disabilities. The National Institute on Disability and Rehabilitation Research funds centers and supports grants related to technology research and utilization.

The Assistant Secretary is also planning a new initiative. During fiscal year 1989, OSERS plans to use RSA special demonstrations and NIDRR demonstration authority to fund grants to support State development efforts to achieve a Statewide comprehensive approach to the delivery of technological goods and services. The project period for these grants would be 5 years, and they will focus on developing technology providers, and standards for these providers, in order to evaluate the quality of service, developing information on the availability and use of devices through education and public awareness, professional training and resource development, examining the rehabilitation engineering delivery system to coordinate programs which provide these services, conducting State technology needs-assessment, employing the trial use of equipment loan programs to make technology available, and identifying and coordinating funding sources for technological devices and services. This program of grants should encourage State policy-makers to focus on the opportunities provided by rehabilitation technology and on the desirability of developing improved systems of services.

OSERS is also examining the training, information dissemination, and development of incentives for commercial pursuit of technological aids for people with disabilities. The Rehabilitation Services Administration is currently funding four rehabilitation engineering training projects. For fiscal year 1986, one project was funded for $100,000. In fiscal year 1987, we funded four projects for $500,000.

NIDRR and the Office of Special Education Programs have substantial information dissemination activities under way to assist in making information about technology readily available to consumers and service providers. OSEP supports a center to provide a national exchange of information that will increase the availability, quality, and appropriate use of instructional technology in special education. The Office of Special Education is also involved in the development of incentives for the commercial pursuit of the application of technological devices to meet the needs of people with disabilities.

I can assure you that the Assistant Secretary has established the improvement of technological services and devices to assist people with disabilities as one of the highest priorities in OSERS, and I make a commitment to you today that we are willing to work with members of your Subcommittee to further this objective and see that it happens. Thank you.

[The prepared statement of Susan S. Suter follows:]

STATEMENT OF

SUSAN S. SUTER

COMMISSIONER

REHABILITATION SERVICES ADMINISTRATION

REPRESENTING

MADELEINE WILL

ASSISTANT SECRETARY OF SPECIAL EDUCATION

AND REHABILITATIVE SERVICES

U.S. DEPARTMENT OF EDUCATION

ASSISTIVE TECHNOLOGY FOR PERSONS WITH DISABILITIES

BEFORE THE

SUBCOMMITTEE ON SELECT EDUCATION

U.S. HOUSE OF REPRESENTATIVES

JUNE 30, 1988

I am pleased to be here on behalf of the Assistant Secretary, Office of Special Education and Rehabilitative Services (OSERS) to testify on assistive technology for persons with disabilities. Assistive technology is an area of interest throughout OSERS. Each of the three major OSERS program components supports activities in technology. Under the vocational rehabilitation program, State rehabilitation agencies provide a wide range of technological aids and devices to disabled persons to assist them in becoming employed. Since 1986, State agencies have been required to provide rehabilitation engineering services, if appropriate, to all clients. The special education program supports project grants to advance the use of new technology, media, and materials to assist in educating and providing related services to children with handicaps. The National Institute on Disability and Rehabilitation Research funds rehabilitation engineering centers and supports selected project grants related to technology research and utilization.

There is a growing appreciation of the role that technological aids and devices can play in increasing the educational opportunities, vocational performance, and quality of life for persons with disabilities. The types and numbers of such devices have increased substantially in recent years. This is particularly true in regard to computer and other electronic equipment, which can dramatically increase the communication and information-processing abilities of persons with disabilities. Technological aids may also be used to provide greatly increased mobility and environmental control for severely physically disabled persons, enabling them to engage in a broader range of activities.

Technological aids for disabled persons need not be expensive or complicated. Many disabled persons can benefit greatly from simple, straightforward, often inexpensive equipment or modifications to their personal environment or worksites. Examples of this are relocated or adapted electrical or mechanical controls and sensors, and simple jigs or fixtures to assist in holding or positioning items necessary for work or daily living. However, the evaluation of a disabled person's technology needs, the determination of an appropriate and cost-effective technological solution, and the purchase, or design and fabrication of the technological device is complex and requires a high degree of specialized knowledge and skill. Simple solutions are sometimes arrived at only after the consideration of many interrelated human, technical, administrative, or financial factors. Yet these factors are often not easily managed or coordinated to ensure that the right technology is available and delivered to the handicapped individual.

More specifically, the provision of technology to persons with handicaps is currently characterized by a fragmented service delivery system in which the purchase of technology, the delivery of technology, and information about technology are not integrated into a mutually reinforcing and complementary whole. Rather, a very inefficient, uncoordinated approach to the provision of technology exists. For example, medical providers may prescribe and pay for an assistive device for an individual, but the device may not be usable or compatible with the vocational, educational, or independent living needs of the same

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client, although such a compatible device may exist. In addition, the funding requirements for the purchase of technology from sources that are reimbursed by health insurance funds may result in incomplete or inappropriate services being delivered. Under the present system of medical reimbursement, moving a client from the bedroom to the bathroom may be of paramount importance and devices to do this can be provided. The client's real need, however, may be to be able to move to and from, and work comfortably at, a home computer workstation. Yet, expenditures for these work-related devices may not be covered. Similarly, devices for mobility may be provided without regard to their potential usefulness and appropriateness in meeting an individual's work-related travel needs. Because technological aids provided through health insurance sources are oriented toward remedying needs directly related to medical care, the vocational, social, educational, and other long-term client needs are often either not considered or are judged not relevant to satisfying the objectives of the medical care system.

The problem of fragmentation is further illustrated by the provision of advanced technical equipment such as communications aids, environmental control systems, and information processing devices. This equipment needs to be planned for and provided on a systematic basis to avoid the problems, well known to users of small computers and their peripherals, in which two or more devices purchased separately will not work together. Planning for compatibility in these cases

is difficult, if not impossible, to achieve. The result is that the disabled user ends up with devices that will not work together, resulting in the need to purchase additional technology that is compatible.

There is also a lack of information about programs and funding sources for technology because of the wide range of potential payors and the lack of personnel who are familiar with the various programs and their requirements. Technical knowledge of products and solutions must be utilized in combination with program and financial information to provide and pay for devices in an efficient and logical manner. The recent growth of the rehabilitation engineering area has, in many cases, outpaced the commonly available knowledge about these technological solutions and how to evaluate and fund them.

To begin addressing the problems that are outlined, last year the Assistant Secretary formed a Task Force on Rehabilitation Engineering composed of representatives of major public and private providers and consumers of rehabilitation technology. The Task Force has been extremely helpful to the rehabilitation engineering community. It will collect, produce, and disseminate information on rehabilitation engineering services. To date, the Task Force has conducted a survey on the delivery systems for rehabilitation engineering services and prepared discussion papers on sources of financing rehabilitation engineering services, service systems, and the provision of rehabilitation

engineering services by State vocational rehabilitation agencies. We also anticipate that it will serve as a focal point for collecting information from outside organizations on a variety of issues, which may include financing, model service systems, and technology development in the State-Federal vocational rehabilitation system.

As one strategy to develop a more integrated and coordinated system to ensure the effective delivery of technology to handicapped individuals, the Assistant Secretary is planning a new initiative. Specifically, in FY 1989 OSERS is planning to use Rehabilitation Services Administration (RSA) special demonstration or National Institute on Disability and Rehabilitation Research (NIDRR) demonstration authority to fund grants to support State development efforts to achieve a statewide comprehensive approach to delivering technological goods and services to persons with handicaps. These grants would be designed to identify gaps in services and develop strategies for filling them, and to develop the potential of existing service systems to provide cost-effective solutions to the problems created by disabling conditions. The conceptual model for these grants would be the "Statewide change" demonstration grants for supported employment. The project period would be five years. These grants would be specifically focused on:

- o The development of technology providers, provider roles, and standards that are applied to providers to evaluate the quality and effectiveness of services;

- The development of information concerning the availability and uses of technological devices and the development of model systems to procure devices;

- The provision of education and public awareness activities;

- The provision of professional training and resource development;

- The examination of State education, rehabilitation, health, and insurance regulations, policies, and programs to identify and eliminate barriers to delivering technology and technology services in a comprehensive and coordinated fashion;

- The conduct of State technology needs assessments;

- The trial use of innovative methods, such as equipment loan programs, of making technology available; and

- The identification and coordination of State and local financing and reimbursement mechanisms for the provision of technology services.

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I believe that this program of grants for Statewide change in delivering technology will begin to address the problems in the service delivery system that I have identified. This program should focus the attention of State policymakers on the opportunities that rehabilitation technology can provide and on the desirability of developing improved systems of service. The activities that these programs would support are the critical elements of an improved approach to the delivery of services and the success of these efforts could then be described to additional States through a vigorous outreach process.

In addition to improving the coordination of technological services, there are other service needs in the areas of training, information dissemination, and the development of incentives for commercial pursuit of technological aids and devices which can assist individuals with disabilities to learn, work or participate in community activities. I will provide some examples of what OSERS is doing in each of these areas. In the area of training, RSA is funding four projects in the field of Rehabilitation Engineering. For fiscal year 1986, RSA funded one project at the level of $105,000 in the area of rehabilitation engineering. For fiscal year 1987, RSA funded four additional projects for rehabilitation engineering at an overall cost of $435,806. These four projects are expected to increase the number of qualified rehabilitation engineering personnel. Also, NIDRR has recently entered into an agreement with the Association for the Advancement of Rehabilitation Technology (RESNA) to

to conduct a needs assessment to determine the availability of service delivery personnel and what their training needs are, and to develop recommended qualification standards for these personnel.

Both NIDRR and Office of Special Education Programs (OSEP) have substantial information dissemination activities under way to assist in making information about using technology to assist persons with disabilities more readily available to consumers and service providers. OSEP currently supports a Center to provide for a national exchange of information that will increase the availability, quality, and appropriate use of instructional technology in special education. One objection of this project is to provide marketing strategies, legal information, and consultation to individuals involved in developing technology to be used in the instruction or management of children with handicaps. A second objective is to provide information to publishers and distributors to encourage private sector involvement in producing and distributing instructional technology for use in the education of children who are handicapped. The third objective is to provide information about the emerging trends in technology and how technology can best be used to meet the needs of these children and youth.

NIDRR is supporting information dissemination activities through Rehabilitation Engineering Centers and through a national project with the Electronic Industries Foundation to promote the utilization and dissemination of rehabilitation technology, including devices and worksite adaptations. A major function of the EIF

project is to stimulate and increase the commercial availability of rehabilitation technology by working with private industry in the areas of research, production, marketing, and distribution of technology for persons with disabilities.

NIDRR and RSA both have provided funds for the Job Accommodation Network (JAN). This project provides individualized telephone assistance about technical solutions to job accommodation problems. JAN maintains data on thousands of rehabilitation problems related to physical or technological barriers to employment, and devices and techniques which have been used in their solution. The JAN project provides direct information to service providers about techniques or devices that have been shown to work in specific situations.

OSEP is also involved in the development of incentives for the commercial pursuit of the application for technological devices to meet the needs of individuals with disabilities. For example, because they believe that special education is not a lucrative market, publishers are reluctant to invest in the development of software specifically targeted to handicapped students. Therefore, OSEP has funded a contractor to develop information or guidelines that will help teachers and administrators make more effective use of currently available general software in working with special needs children and to develop guidelines that will help developers and distributors of software to refine the design of general software to meet the needs of teachers who instruct handi capped children with varied learning needs.

I assure the Members of this Subcommittee that the Assistant Secretary has established the improvement of technology services to disabled individuals as one of the highest priorities of OSERS and that OSERS is willing to work with Members of the Subcommittee to achieve this objective.

Mr. OWENS. Thank you, Commissioner.
Mr. Morris?

STATEMENT OF MICHAEL MORRIS, COALITION ON TECHNOLOGY AND DISABILITY

Mr. MORRIS. Good morning. My name is Michael Morris and I am the Director of the Community Services Division of United Cerebral Palsy Associations. I am testifying today on behalf of the Coalition on Technology and Disability, consisting of more than 90 national organizations who represent the diverse interests of professionals, administrators, parents, and children and adults with disabilities. Nineteen months ago, this coalition was formed and was motivated out of a set of values.

First, that the benefits of assistive technology impact individuals of all ages with disabilities and all major life activities, and second, that regardless of the nature and severity of disability, assistive technology will be part of the solution to overcoming the barriers to increased independence, productivity, and integration for thousands of children and adults with disabilities.

On behalf of our coalition, I want to thank you for inviting us to testify today, and I want to thank particularly Chairman Owens, Representative Jeffords, and Representative Bartlett for introducing this legislation and for their leadership in forging a consensus on a bill that many organizations fully support and endorse, which is H.R. 4904, The Technology-Related Assistance for Individuals with Disabilities Act of 1988.

The coalition members feel that H.R. 4904 is an important first step in a process of building a system nationwide that is responsive to consumers and that provides access to technology devices and services to meet the needs of individuals of all ages with disabilities. This legislation responds to many of the concerns that were raised at your May 10, 1988 hearing and sets a framework for future decision-making at the State and Federal levels.

As the experiences of members of the coalition repeatedly indicate, the problems faced by children and adults with disabilities in accessing assistive technology devices and services are complex. It is not simply a problem of awareness and funding. There is also a critical need to build the capacity of States to provide assistive technology services in cooperation with community-based organizations and the private sector. In addition, a critical need exists to coordinate the policies and resources of many State agencies that could be involved in a comprehensive program of technology-related assistance. Finally, no Statewide program could be implemented without a comprehensive system for training professionals, providers, agency leaders, and potential users of such technology.

I would like to comment on several specific sections of the bill. Title I of the Act establishes new authority for funding grants to States to develop and implement consumer-responsive comprehensive programs of technology-related assistance. The coalition believes that States will be eager to compete for these new funds. The three and potentially two-year grants will provide important seed money that will both fill in the gaps in current technology assistance efforts and help leverage other public and private resources.

In addition, Title I respects the interests of States to make their own choices in determining how to spend the funds across multiple areas of interest and technology-related priorities. States are at many different points in their provision of technology-related assistance to children and adults with disabilities. Due to the differences in the State experiences, the coalition strongly supports the provisions of Section 106(b)(1). This section, which authorizes the expenditure of a minimum of $500,000 on an annual basis, will provide very important needed technical assistance to States to share effective strategies for interagency coordination, public involvement, and service delivery. Most importantly, we believe that it will expedite State development of comprehensive programs of technology-related assistance.

We also feel very strongly about Title II of the Act which responds to a number of technology-related program areas of concern to coalition members. We support the two studies that are called for in the bill. The first, to be done by the National Council on the Handicapped will focus needed attention on the problems that exist nationwide for individuals with disabilities and their families who do not have the economic means to purchase or obtain financing to acquire assistive technology devices and services. We believe that the Council should be able to make recommendations to the Congress that would improve State-Federal and public-private cooperation.

The second study called for in Title II will also be of great benefit to providers, consumers, parents, and the other individuals who become involved in technology-related assistance. The current state of knowledge on the most cost-effective approaches to sharing information on assistive technology makes it extremely difficult for any State or the Federal Government to proceed at this time without more adequate study.

Finally, parts C and D of the Act authorize funding for a variety of new discretionary projects. With a focus on training, public awareness, demonstration, and innovation, these activities will add to our body of knowledge on best approaches to technology-related assistance. The coalition believes that these efforts will complement and enhance State planning and development activities under Title I.

There are several issues of concern to think about for the future. With the authorization level of less than $15 million in the first year for this Act, this legislation must not be seen as a comprehensive fix for all the problems that are faced by individuals with disabilities. This Subcommittee has jurisdiction over other Federal programs which dramatically impact on individuals with disabilities of all ages. Beginning at birth, continuing through the public education years, and then through adulthood, Public Laws 99-457, 94-142, 99-506, and 100-175 offer resources and mandates that should enable an individual with a disability to become more independent, productive, and better integrated into the mainstream of society. H.R. 4904 can provide leadership and direction to help focus these combined State and Federal resources of over $3 billion annually on the assistive technology needs of individuals with disabilities. This legislation should encourage participating States to try new things and better coordinate existing systems to build a

better technology-related assistance network of service delivery that is accessible to all individuals with disabilities in need.

Just as important as the passage of this legislation, is the need for the Subcommittee to consider technology-related issues during the next three years. With each new authorization of major Federal programs, such as special education, early intervention, and vocational rehabilitation, the collective experiences resulting from implementing H.R. 4904 should focus new attention on State-plan and individual-plan requirements of each of the laws I just mentioned.

Computers, augmentative communication devices, adapted toys, powered mobility and environmental control systems are dramatically beginning to change the quality of life for individuals with disabilities. Assistive technology services and devices have the potential to make a difference in the home, classroom, and work site. H.R. 4904 should bring new attention and resources at the State and Federal level to benefit persons with disabilities through assistive technology. The coalition urges the Subcommittee to move ahead rapidly to pass H.R. 4904 and to seek funding to the full authorization levels.

I would like to address just two comments that were made by the other witnesses. I would strongly echo Mr. Batavia's comments concerning not replicating a system of centralized centers to provide services. There are other approaches that have been tried and are beginning to be successful around the country. In New Jersey, Virginia, and Kansas people have moved to mobile systems of service delivery which allow, through the use of vans and certain types of trucks, that there can be mini-laboratories that travel to the site to modify a work site so that an individual with a disability can get a job there, to the home working in terms of adaptive toys, sitting, and positioning, and in classrooms working with teachers and the child in terms of developing an understanding of the use of computers and augmentative communication devices. We do not need to just replicate the traditional system of rehabilitation which has modeled itself after the medical model where everyone has to go to where the service providers are. We can try other approaches and I think that this piece of legislation allows States to do that.

The second issue Mr. Batavia mentioned was that he would like to see an increased focus in this legislation on dissemination of information versus the provision of technologies. I think that there are many things that make up the solution to providing a system of technology-related assistance, but that your legislation provides the flexibility to States to make their own decisions. Each State is at a different point, and there is no single step that you can miss that is going to insure that we do have a fully comprehensive system. It is more than financing and more than information and awareness. It is a complete system that involves trained personnel as well as a service delivery network.

Finally, in my last point, I would like to mention to you two situations that were brought to our office in just a span of several weeks. One involved a young girl, 9 years old, with multiple physical impairments, who needs access to an augmentative communication system. She can't speak. Unfortunately, the policies in that particular State are that if a child is non-verbal, within their State

education system, the child does not automatically have the right to access speech and hearing services. As a result, she can not even get to people who might train her and sensitize her and eventually get her a system of augmentative communication. It is that type of policy change that States will have an opportunity to look at because of these grants.

The second situation was a young child living in Denver, Colorado. Within their State they could not find anyone who could assess this child's needs. Fortunately in this situation the parent had the means to take the child to a program in Seattle, Washington. They received assistance and augmentative communication devices, a computer, and some special software with accessing devices that would allow this child to use the computer. They brought all those materials back home and took them to the classroom where this particular child is enrolled—it is a regular classroom in this case—and unfortunately, the teachers there have no idea how to use this technology. Despite the efforts of the parent and the use of their private resources, that equipment is sitting unused. That is the kind of issue that this legislation can remedy, and the Coalition on Technology and Disability thanks you for your leadership.

[The prepared statement of Michael Morris follows:]

Coalition on Technology & Disability

STATEMENT

RESPECTFULLY SUBMITTED

TO THE

UNITED STATES HOUSE OF REPRESENTATIVES

EDUCATION AND LABOR COMMITTEE

SELECT EDUCATION SUBCOMMITTEE
ON "TECHNOLOGY-RELATED ASSISTANCE FOR
INDIVIDUALS WITH DISABILITIES ACT OF 1988"

JUNE 30, 1988

PRESENTED BY
MICHAEL MORRIS

ON BEHALF OF
THE COALITION ON TECHNOLOGY AND DISABILITY

Suite 700 • 1101 Connecticut Avenue, N.W. • Washington, D.C. 20036 • 202.457.1199

My name is Michael Morris. I am Director of the Community Services Division of United Cerebral Palsy Associations. I am testifying today on behalf of the Coalition on Technology and Disability consisting of over 90 national organizations who represent the diverse interests of professionals, administrators, parents, and children and adults with disabilities. Nineteen months ago, representatives of such diverse interests as the American Society of Mechanical Engineers, American Association For the Advancement of Sciences, United Cerebral Palsy, American Foundation For the Blind, Association for the Advancement of Rehabilitation Technology - RESNA, and Paralyzed Veterans of America began meeting on a monthly basis united by a common goal: to coordinate efforts to improve public policy on assistive technology and close the gap between technology innovation and consumer awareness and access. Members of the Coalition on Technology and Disability are motivated by a (common) set of values: (1) the benefits of assistive technology impact individuals of all ages with disabilities in all major life activities; and (2) regardless of the nature and severity of disability, assistive technology will be part of the solution to overcome barriers to increased independence, productivity, and integration.

On behalf of the Coalition, I want to thank the Chairman and the other members of the Subcommittee for this invitation to testify today and for your leadership in introducing H.R. 4904, "The Technology Related Assistance For Individuals with Disabilities Act of 1988." The Coalition members strongly endorse H.R. 4904 as an important first step

in providing federal leadership to encourage the development of consumer-responsive statewide programs of technology related assistance for individuals of all ages with disabilities. This legislation responds to many of the concerns raised at the May 10th hearing and sets a framework for future decision making at the state and federal level. As the experiences of members of the Coalition repeatedly indicate, the problems faced by children and adults with disabilities in accessing assistive technology devices and services are complex. It is not simply a problem of awareness and funding. There is also a critical need to build the capacity of states to provide assistive technology services in cooperation with community-based organizations and the private sector. In addition, a critical need exists to coordinate policies and resources of the many state agencies that could be involved in a comprehensive program of technology related assistance. Finally, no statewide program could be implemented without a comprehensive system for training professionals, providers, agency leaders, and consumers.

For the remainder of my testimony, I would like to comment on some of the beneficial aspects of the Bill, as well as raise some concerns.

TITLE I

Title I of the Act establishes new authority for funding grants to states to develop and implement consumer responsive comprehensive programs of technology-related assistance. The Coalition believes that states will be eager to compete for these new funds. The three and potentially additional two year grants will provide important seed money that will both fill in the gaps in current technology assistance efforts and help leverage other public and private resources. In addition, Title I respects the interests of states to make their own choices in determining how to spend the funds across multiple areas of interest and technology related priorities. States are at many different points in their provision of technology related assistance to children and adults with disabilities. Several states such as New York and Minnesota have already convened task forces and developed tentative plans for action. Other states have not even begun to bring together the resources from the public and private sector, to identify needs, or respond to problems of assistive technology availability. In light of the current differences in state experiences, the Coalition strongly supports the provisions of Section 106(b)(1). This Section, which authorizes the expenditure of a minimum of $500,000 on an annual basis, will provide needed technical assistance to states to share effective strategies for interagency coordination, public involvement, and service delivery. Most importantly, it will expedite state development of comprehensive programs.

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TITLE II

Title II of the Act also responds to technology related program areas of concern to Coalition members. The study to be conducted by the National Council on the Handicapped will focus needed attention on the problems that exist nationwide for individuals with disabilities and their families who do not have the economic means to purchase or obtain financing to acquire assistive technology devices and services. The Council should be able to make recommendations to the Congress that would encourage improved state-federal and public-private cooperation.

The second study, called for in Title II, will determine the feasibility of establishing a national information and program referral network on assistive technology. The current state of knowledge on the most cost-effective approaches to sharing information on assistive technology makes it extremely difficult for any state or the federal government to proceed at this time without more adequate study.

Finally, Parts C and D of the Act authorize funding for a variety of new discretionary projects. With a focus on training, public awareness, demonstration, and innovation, these activities will add to our body of knowledge on best approaches to technology related assistance. The Coalition believes these efforts will complement and enhance state planning and development activities under Title I.

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RECOMMENDATIONS FOR CHANGE

The Coalition members ask your consideration of two amendments we believe will strengthen H.R. 4904.

1) This legislation was developed with the assistance of many organizations and individuals. We appreciate your efforts to reach out for advice in building this consensus bill. That same sensitivity to an inclusive process is reflected in the public involvement requirements mandated for each state in Title I. However, to be fully responsive to the needs of the individuals with disabilities for information, Section 102(e)(16) should be strengthened. In preparing information for dissemination, each state "should be required" to use auditory materials including audio cassettes, visual materials including video cassettes, and braille materials and "consider the use of emerging new technologies such as videodiscs." The first step for a potential user of assistive technology is to become informed of what is available. Information in a timely fashion and in accessible formats must be a requirement of any statewide consumer responsive comprehensive program.

2) Technology related assistance is more than matching a device to an individual with a disability. All the research and development efforts are wasted if we do not establish a system of services to access new technologies. The backbone of a service delivery system is trained personnel to provide technology related assistance to

children and adults with disabilities. Today, even without the demands that will be created by implementing this legislation, there is an inadequate supply of trained practitioners and agency leaders with the necessary expertise in assistive technology. The Coalition recommends a separate authorization of $2.5 million for the training component to more adequately address the training needs of potential users, practitioners, and agency leaders.

ADDITIONAL CONCERNS FOR THE FUTURE

With an authorization level of less than $15 million in the first year, this legislation must not be seen as a comprehensive fix for all the problems faced by individuals with disabilities in accessing technology-related assistance. The legislation cannot stand alone. This Subcommittee has jurisdiction over other federal programs which dramatically impact on individuals with disabilities of all ages. Beginning at birth, continuing through the public education years, and then through adulthood, Public Laws 99-457, 94-142, 99-506, and 100-175 offer resources and mandates that should enable an individual with a disability to become more independent, productive, and integrated into the mainstream of society. H.R. 4904 can provide leadership and direction to help focus annually these combined state-federal resources of over three billion dollars on the assistive technology needs of individuals with disabilities. At its best, this legislation should encourage participating states to try new things and better coordinate existing systems.

Just as important as the passage of this legislation, is the need for this Subcommittee to consider technology-related issues during the next three years. With each reauthorization of major federal programs - special education, early intervention, and vocational rehabilitation, the collective experiences resulting from implementing H.R. 4904 should focus new attention on state plan and individual program plan requirements of each of these laws (e.g., IEP, IFSP, IWRP,

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respectively). In addition, there remains the impediments to fuller access to technology as a result of federal laws outside the jurisdiction of the Committee (such as Medicaid and Medicare).

CONCLUSION

Computers, augmentative communication devices, adapted toys, powered mobility and environmental control systems are dramatically beginning to change the quality of life for individuals with disabilities. Assistive technology services and devices have the potential to make a difference in the home, classroom, and work site. H.R. 4904 should bring new attention and resources at the state and federal level to benefit persons with disabilities through assistive technology. The Coalition urges the Subcommittee to move ahead rapidly to pass H.R. 4904 and seek funding to the full authorization levels.

On Behalf Of:

Affiliated Leadership League of and for the Blind

American Association of University Affiliate Programs

American Association on Mental Deficiency

American Council of the Blind

American Foundation for the Blind

American Occupational Therapy Association

American Physical Therapy Association

American Speech-Language-Hearing Association

Association for Retarded Citizens

Blinded Veterans Association

Cystic Fibrosis Foundation

Electronic Industries Association

Epilepsy Foundation of America

International Society for Augmentative and Alternative Communication

National Association of Medical Equipment Suppliers

National Association of Protection and Advocacy Systems

National Easter Seal Society

National Head Injury Foundation

Operation Job Match

RESNA - Association for Advancement of Rehab Technology

United Cerebral Palsy Associations

World Institute on Disability

Mr. OWENS. Thank you.

I yield to the sponsor of the legislation, Mr. Jeffords.

Mr. JEFFORDS. Thank you very much.

Thank you all for your excellent testimony.

Mr. Morris, we certainly will look at your comments and perhaps will make some modifications and changes in the areas that you have suggested.

I just want to say that the most exciting work that I have had an opportunity to do in Congress has been on this subcommittee. I came here in 1974 and worked with John Brademas in the development of giving an access to education through Public Law 94-142, and then we worked very hard on giving people access to the outside world through the Access to Public Buildings Act. I was very pleased to have participated in that. Now we are giving them access to the technology that will broaden their lives even further. This is sort of the culmination of a long time and a lot of work, and it is the most rewarding part of my Congressional work.

Ms. Suter, I deeply appreciate the cooperation of the Administration. I know that it is not easy to get approval of new programs and I understand, from the fiscal restraints that we have, that there are good reasons for being careful on that. Therefore, I deeply appreciate the cooperation, coordination, and support of the Administration of this. Also, I am very pleased with what you have outlined as to what you are presently doing. Thus, we can complement each other and insure that the good work you are starting now will carry on through the next administrations with our help.

I deeply appreciate the comments of you all and we are going to take a look at the bill to make sure that the emphasis is in the right places. When there are limited resources there always is a tendency for everybody to want it all to go the way that they particularly think it should which is not always possible.

Thank you all very much.

Mr. OWENS. Mr. Bartlett?

Mr. BARTLETT. Thank you, Mr. Chairman.

As I listened to the testimony this morning a couple of themes seemed to come through. First there seemed to be a universal aversion to and resistance to having this legislation result in centralized centers. There seems to be a consensus both in this legislation and from the witnesses that the result of this ought to be access to technology in a much more decentralized method. That is important to note because I think that is an important part of the bill. I also think that as the bill is implemented over the next 5 years it does leave room to simply set up a center somewhere and think that we have done the job. So I do appreciate the witnesses commenting on that.

Secondly, as I listened to the testimonies and particularly the testimony of Commissioner Suter, I wanted to express my appreciation for your efforts and the efforts of the Administration in what you are already doing and in your willingness to work with Congress to do more. The world of technology has opened up a new world to many individuals with disabilities. We could do so much more and it seems to me to be a matter of access, primarily, although the development of new technologies is part of it also. As I listened to your testimony and as I read the bill, particularly in the

reporting systems—the uniform information system contained on page 38, and in the reporting systems from the States—it occurs to me that perhaps the most difficult part of your job is going to be to develop a reporting system that this bill provides for of reporting based on results, as opposed to reporting based on activities. At this moment, that is probably my chief concern. We may want to work with you between now and the markup, with the chairman, to see if there is a way to give better guidance in this bill. The easiest thing in the world would be to sit back, having set out the grants, and have the States report back on what they did, as opposed to what they accomplished. At the same time, we have tried to acknowledge that there is a flip-side to that problem which is that if we are too proscriptive in the bill in proscribing accomplishments, then we will have bureaucracies at the State, Federal, local, and Congressional levels who may find it awfully easy to pat themselves on the back after looking at the big numbers. There may be many who are not affected at all, but we have large numbers. We have provided in the uniform information system for you to consider and develop a qualitative and quantitative description of the impact of these programs. We may want to work with you and the other witnesses to see if there is a way to tighten that up in the actual reporting system so that we can put into the legislation the tools that you need to end up with means to report on the impact of this legislation on people's lives. We don't want to end up having a report on the activities that we all did without any description of what impact it had on lives. Ms. Suter, do you have a comment on that reporting system concerning what you have in mind now and how you may be able to effect that?

Ms. SUTER. I agree with what you said. I think that a lot of times we do look at quantity instead of quality and the question of whether we are really making a difference in people's lives. We would be happy to look at that.

We have some reporting mechanisms in place now, and we would be happy to talk about that to see how we might be able to combine those.

Mr. BARTLETT. Mr. Morris, do you have any comments on how the reporting system could be targeted as results-oriented as opposed to activities-oriented?

Mr. MORRIS. We also would agree with your comments. I think that perhaps the key is looking at the terms independence, productivity, and integration, focusing on those as impacts and outcomes. If it is a child, what did the access to technology do to bring change in that child's life? If it is an adult, and if that technology helped that individual to get a job, then obviously we have made a major difference. If it changes the conditions in the place where they live so that they have more independence, where they have more choices, then technology has made a difference. I think we might look at those three words as the keys to an outcome or a results-oriented indicator.

Mr. BARTLETT. One other question I have is, in each of your opinions, what are the chief barriers to the use of technology today by persons with disabilities?

Mr. BATAVIA. As I indicated in my testimony, I think that the chief barrier is the financing. A wheelchair like the one that I am

sitting in now costs $10,000. Fortunately I am employed by an employer who has a very comprehensive health insurance policy. However, even with my Blue Cross and Blue Shield, I still have to pay a 20 percent co-payment, which means $2,000 out-of-pocket. With the recent revisions in the tax law, that $2,000 is less deductible than it was previously, so this is an enormous burden for a population who are less capable of bearing a burden than the general population. I think that we need modifications to the Medicare system and to Medicaid requirements. I think that States should be providing these assistive devices as part of their Medicaid plans.

I don't want my earlier comment to be misconstrued. What I was saying was that, given the limited funding for this particular bill, I do not think that it is necessarily appropriate that the funding go to the actual provision and repair of devices, but clearly I think that we need to be addressing the broader financing issues and making funds available from a broader pot of money like Medicare, Medicaid, Veterans' Administration, and vocational rehabilitation agencies.

Mr. BARTLETT. So in your view, the demand pull would pull the access through the system if there were an effective demand with money available.

Mr. BATAVIA. If the funds are available the devices will be forthcoming.

Mr. BARTLETT. Commissioner Suter?

Ms. SUTER. I would agree with that on funding. Additionally, I think coordination is a very big problem and I think it is one that the bill addresses. That is one of the reasons why we in OSERS are looking at the Statewide demonstration projects to address coordination. I think that getting information out about the kinds of technology that are available is important, but giving people the opportunity to test devices before they decide to purchase them is also important. We are renewing a contract that we have with Able Data which has a computer system that helps users find out what kind of technology is available. We are also funding a program called The Job Accommodation Network whereby employers can call in to ask about reasonable accommodations on the job and get some assistance with that. I think that the third thing is training. RSA has been involved in that. We are going to put a person on staff to take the lead in RSA for rehabilitation engineering so that we can put these pieces together in order to be able to offer guidance to the States. I think that there needs to be training on all different levels, from management to case managers to personnel who are actually working on the assistive devices, and certainly, to the counselors in the field. I think that those are the major four issues.

Mr. BARTLETT. When you renew your contract with Able Data, are you going to improve it?

Ms. SUTER. NIDRR also has planned a needs-assessment to look at the needs that are out across the country, and given that information and given what we are going to be working on with this bill, we will be looking at improving Able Data to see if we do indeed need to expand it. We know that there is a need to better disseminate information.

Mr. BARTLETT. Mr. Morris?

Mr. MORRIS. I agree, with perhaps one major exception. No two individuals with disabilities have the same needs. Perhaps at one end of a continuum it may be just a case of matching a device to an individual's need to improve their functioning, but given the range and severity of disabilities, what you find is that we have to have a system in place that does more than just match the device to a need to improve function, and that is where you get into the issues of trained personnel across many disciplines and the issues involved in a service delivery system. That involves improved coordination between the many funding streams and involves better efforts at a local and State level as well as at the Federal level. There is no single simple answer. You have to pull all of the pieces of the puzzle together and I think that the State grants in Title I give States the opportunity to do that.

Mr. BARTLETT. That's all I have. Thank you, Mr. Chairman.

Mr. OWENS. I think you have anticipated my question and already answered it. I thought that I was hearing from you a uniform agreement that funding was not a problem and yet, we had a panel of consumers testify in another hearing that the basic problem was funding. What your saying is that funding is a problem but that you don't think this bill should address that because it would spread it too thin. I still think we better take another look at that because what I heard from the other consumers was that even the simplest of these devices are not affordable for some of the people who need them. We need to take a hard look at that.

Mr. MORRIS. I would certainly agree. I think that we should not leave this hearing today with the notion that funding is not a problem because in each State, we are at a different point in the evolution of a comprehensive system of technology-related assistance. In many States funding would be right at the top of the list.

I like the way that Title I is set up because you provide the flexibility to the State to make that choice based on where they are in their evolution of building a system.

Mr. BATAVIA. What I was trying to say is that I believe that funding is the primary problem, and that I am glad that the bill addresses this through the study that is supposed to be conducted by the National Council. However, I think that the limited funding in this bill could be much better spent through the dissemination of information and the testing of products by consumers so that they can make a good decision and so that all of these other funds do not go to waste through abandonment of technologies.

Mr. OWENS. Finally, Commissioner Suter, you mentioned commercial pursuits for people with disabilities. I don't think we address that at length in the bill, but I am curious to know how that program works. Is that an on-going program or is it just beginning?

Ms. SUTER. That is the issue of marketing. NIDRR did a project with the Electronics Industry Foundation to try to interest companies in marketing and producing devices that we thought made sense. What we found through that project is that it is difficult to talk businesses into producing these devices because of issues such as the cost, the question of whether there are users out there to purchase these devices, concerns about reliability, and concerns about liability. One of the aspects that we are interested in is the involvement of private business and working with them to look at

production of various devices. We need to make that attractive to these private businesses, and that is what I mean when I refer to commercialization. NIDRR sponsors or funds three rehabilitation engineering centers throughout the country, and one of those will be looking at that issue.

Mr. OWENS. That is commercial pursuit of people with disabilities. I thought I heard you say commercial pursuit for people with disabilities themselves, that is, people with disabilities engaging in commercial pursuits.

Ms. SUTER. No, it is the issue of getting private businesses interested in producing these devices and marketing them.

Mr. OWENS. All right. I want to thank you all very much. I think that we have heard testimony which will enable us to finish this bill which I think is already in very good shape. Thank you again.

[Whereupon, at 10:00 a.m., the Subcommittee was adjourned, to reconvene at the call of the Chair.]

[Additional material submitted for the record follows.]

June 1, 1988

Testimony of

APPLE COMPUTER INC.
OFFICE OF SPECIAL EDUCATION
and the

NATIONAL SPECIAL EDUCATION ALLIANCE
before the

U.S. HOUSE OF REPRESENTATIVES
COMMITTEE ON EDUCATION AND LABOR
on

Technology-Related Assistance for Persons with Disabilities Act

Statement submitted by

James Johnson
Director of Government Affairs
Apple Computer, Inc.

NEED FOR FEDERAL LEGISLATION

It is estimated that nearly 4.5 million American children with disabilities could benefit from legislation which would create easier access to adaptive technology. When this figure is increased by the numbers of adults with disabilities and the numbers of parents, educators, and employers who may benefit from the increased independence of the children and adults with disabilities, the importance of legislation becomes greatly magnified.

Never before has one educational tool, the microcomputer, been so useful for providing so many individually meaningful applications for learning, communication, work, and daily life. For individuals with disabilities, the personal applications of microcomputer technology are even more numerous than for the nondisabled population. These allow for such heretofore inaccessible activities as reading the daily newspaper, composition and proofing of written documents, communication by nonverbal individuals, and access to vast quantities of materials stored electronically.

For individuals with severe disabilities, the microcomputer has extremely important implications for communication with a nondisabled world. It can make education very personal. It can rehabilitate and provide a transition into the world of work. For many individuals with disabilities, microcomputer technology holds the only key to their communication, education, and/or

rehabilitation needs.

APPLE COMPUTER, INC.
OFFICE OF SPECIAL EDUCATION
ROLE AND COMMITMENT

Apple Computer, Inc. established its Office of Special Education in 1985 to address the needs of the disabled community. Apple's Office of Special Education provides awareness of the possibilities offered by technology-related assistance, promotes greater accessibility through built-in microcomputer options, and provides resources and information to individuals with disabilities, their families, and supporting professionals. Apple provides information about the broad range of solutions that exists and demonstrates how to use these various solutions at home, work, and school. The corporate commitment by Apple Computer, Inc. toward the advancement of technology for use by individuals with disabilities is powerful, enduring and passionate.

Apple supports the Congress in its efforts to make technology accessible to individuals with disabilities. The impact of such a program is monumental and will change the lives of individuals with disabilities. It will also change our society's view of disability.

Apple also shares information by using electronic resources to accelerate the adoption of computers into the lives of individuals with disabilities. Apple's Solutions Database contains information on third-party products and resources that customize Apple computers to the needs of disabled children and adults. The Solutions Database provides an enormous capacity to identify the sources of specialized software and adaptive peripherals, support organizations and publications. The Database contains information on more than 1,200 hardware and software products, organizations, and publications that support disabled computer users. It is an important information tool for software developers, service agencies, employers, school and university personnel, Apple dealers, and Apple employees. The Solutions Database is also available in a hard-copy version called Apple Computer Resources in Special Education and Rehabilitation. Apple maintains a 24-hour-a-day electronic drop-in center on SpecialNet, a nationwide telecommunications system for special education teachers and administrators.

Apple has a certified developer program that enables developers to receive current product information, technical assistance, and price reductions on microcomputer equipment. Apple's Office of Special Education also assists hardware and software developers by providing information on how to develop and market specialized hardware and software products for the disabled consumer. Apple puts developers in touch with organizations and resources that are specifically designed to address the needs of disabled computer users.

Apple develops hardware which is more accessible to individuals with disabilities. For example, the control panel on the Macintosh and the Apple IIGS computers enables persons with limited mobility to turn off the repeat key function. Close View, another option in the Macintosh control panel, enables a visually impaired person to magnify the screen up to 16 times the normal size. In addition, when the volume is turned off from the control panel of the Macintosh computer, visual clues are provided, thus enabling a deaf person to see the clues rather than miss the audible system beeps. There are Easy Access options built into the operating system for each Macintosh computer that enable a person with limited mobility to operate the mouse from the keyboard or push several keys in a sequence producing the effect of striking several keys simultaneously. These options are available to all users of these computers at no extra charge. Apple publishes a report card on

accessible features of all Apple computers. This report is generated for public dissemination and to support on-going recommendations to internal developers regarding additional accessibility features that will support more disabled users.

THE NATIONAL SPECIAL EDUCATION ALLIANCE
DESCRIPTION AND GOALS

The development of new technology solutions is occurring so rapidly that individuals with disabilities, their parents and professionals find it difficult to keep up with the new possibilities. Service agencies need up-to-date information on technology to invest their limited resources wisely. Parents and individuals with disabilities often feel that professionals ignore or speak condescendingly to them. On the other hand, professionals often feel that they are being inappropriately challenged or criticized by parents. As new technical ideas and solutions become more prominent in the treatment of individuals with disabilities, it is imperative that we develop different ways for these groups to work together. Apple believes that there is an abundance of information and support to disseminate. To make sure that information and resources are available when and where they are needed, Apple established in 1987 the National Special Education Alliance (NSEA).

The Alliance was initiated by Apple Computer's Office of Special Education in cooperation with the Disabled Children's Computer Group (DCCG). The DCCG is a community-based resource center with a membership of 1,200 parents, teachers, and individuals with disabilities. If offers a wide array of programs and services, and serves as the model resource center for all NSEA resource centers.

The Alliance brings together a core of established organizations dedicated to providing community-based resources to help individuals with disabilities benefit from technology-related assistance in school, at home, on the job, and in the community. The NSEA resource centers are composed of parents of disabled children and disabled consumers working cooperatively with school and university personnel, professional organizations, community leaders and technology vendors. The current 23 NSEA resource centers help individuals discover working partners, ensure timely sharing of information, and serve the computer-related needs of disabled persons.

Simply stated, the goal of the Alliance is to increase awareness, understanding and implementation of microcomputer technology. It is an organization whose members share a common vision and an uncommon commitment to improving the quality of life for children and adults with disabilities. Underlying this goal is the compelling belief that microcomputers are changing what it means to be disabled.

Each center is electronically linked to every other center as well as to major national data bases and bulletin boards via electronic communications networks. This enables each NSEA center to request information regarding specific needs or equipment and receive feedback within minutes or, at least, within 24 hours.

The strength of the Alliance lies in its grassroots orientation. Each resource center is led as much by parents and individuals with disabilities as by professionals. Each center, as a non-profit agency, is autonomous and assumes independent responsibility for sustaining the growth of its local programs and for contributing to the national mission of the Alliance. All NSEA resource centers are committed to establishing a program of activities and events to educate their community about what

computers make possible for disabled children and adults. The NSEA resource centers work closely with hardware and software developers to conduct training workshops and product fairs, to make presentations at disability-related conferences and meetings, and to provide valuable community connections and resources. NSEA personnel keep abreast of current developments in technology-related assistance so that they can pass along the most appropriate and up-to-date advice. NSEA activities also include individual consultations and the sharing of resources, tips, and techniques that benefit the disabled computer user. The technology vendors and professional organizations that are members of the NSEA enthusiastically support the NSEA centers with technical assistance, updated information, and, in selected instances, discount purchasing and equipment loaner programs.

LEGISLATION ISSUES TO BE ADDRESSED

Computer technology touches all of us either directly or indirectly in many dynamic ways. Microcomputers have created totally new approaches to meeting the needs of individuals with disabilities.

Most non-disabled individuals, however, are still unaware of the crucial benefits and applications of technology for disabled children and adults. Increased awareness of technology available for citizens with disabilities should be a goal of any new federal legislation.

Some critical questions must be asked. What is accessible technology? What are the current barriers to technological access? What systems, organizations, and structures are currently in place to provide access? How do parents, consumers, educators, and other professionals perceive the current state of access to technology? How can truly barrier-free access to technology be achieved? What is already being done to expedite access to the new technologies nationally? How can Congress encourage and expedite access to barrier-free technology?

Concern for equity cuts across many of these questions and is a central issue in barrier-free technology. Often, the people who should benefit most from adaptive technology are the people who can least afford it. Many children and adults with disabilities are blocked from accessing useful technology in their communities because they belong to the wrong age group, disability group, socioeconomic group or educational services group. Presently, most agency-based adaptive device resource centers are not in a position to adopt a policy of serving everyone, nor are they in a position to assist individuals in obtaining low-cost technology for personal, around-the-clock use.

RECOMMENDATIONS FOR LEGISLATION

We believe that the inter-disciplinary, cooperative approach characteristic of the NSEA is a critical component in any comprehensive adaptive technology legislation. We believe that the NSEA model takes advantage of systems, organizations, and structures that are currently in place, and introduces new technology and information on a daily basis. The model of the NSEA is especially intriguing because it represents both a healthy partnership between the public and private sectors and a community-based, collaborative approach for getting everybody to work together. Moreover, each community resource center is part of a nationwide communications, information, and service network.

The legislation should support and encourage the active participation of parents,

consumers, professionals, government agencies, and vendors. We believe that to provide the vast amount of resources, training and support necessary to implement such a large-scale technology effort, resources will be needed from both public and private sector participants working together.

To ensure success, we believe that the active involvement of disabled consumers and parents of disabled children is imperative. The distribution of funding must be done through a mechanism that will encourage active leadership on the part of disabled consumers and parents of disabled children.

Apple supports a tax incentive for third party vendors who develop adaptive devices, peripherals, hardware and software for the disabled technology user. We believe that a tax credit which is more substantial for smaller vendors than larger corporations would have a positive effect on many of these small, third party vendors, resulting in benefits to the disabled technology user.

Any plan for the distribution of funds must address a mechanism that can support all age groups and all disability areas. When adaptive equipment is individually tailored, it does not make sense to force the disabled person to reapply for the same technology through a different public sector channel at each stage of his or her life. Congress should provide incentives and standards for an integrated system of services and support throughout the life span of the disabled person. The model for receiving services should be the same for individuals with different disabilities. This service model should also be fiscally flexible enough to the meet changing needs of individuals as they progress through their lives and support the best match of technology as it evolves.

It is important to establish an efficient funding mechanism, one which provides the most direct passage of funds from the federal government to local community resource centers.

We firmly believe that a program which provides loaned, free or reduced priced equipment; assists consumers in seeking public and private funding; or enables individuals with disabilities to qualify for a low cost or subsidized loan program is necessary for equity and should be a substantial part of this legislation.

The legislation should include support for the development of training programs for parents, disabled consumers, educators, vocational rehabilitation counselors and other service providers. The grass-roots resource centers such as the NSEA centers would benefit from comprehensive and on-going training modules for themselves and for the individuals with disabilities, parents and professionals they serve. Start-up training and on-going training can be made available (and should be supported by this legislation) through community-based or state resources with the assistance of developers and vendors. Special grants and other support to college/university training programs in the field of special education, computer science, rehabilitation, engineering and other associated fields should be considered.

The National Special Education Alliance has provided an effective model that provides information and access to disabled technology users. We believe a model that supports community-based centers similar to the NSEA model would meet many objectives of the proposed technology legislation and most of the needs of the individuals with disabilities for whom the legislation is

designed. Twenty-three Apple-supported NSEA resource centers are now in place with plans to include centers in all 50 states within a year. Each of those centers is built on the belief that consumers and their families, with solid information and accessible guidance and support, can and must make their own life decisions.

Apple Computer, Inc. and National Special Education Alliance are firm in their conviction that monumental access is provided by helpful technology devices. We believe that the legislation should address all technology-related assistance devices, not just microcomputers alone. Apple Computer, Inc. and the members of the National Special Education Alliance believe that individuals with disabilities and their families, once informed about what is possible, will have a powerful role in changing and building their own future.

TESTIMONY SUBMITTED
TO THE
SELECT EDUCATION SUBCOMMITTEE
OF THE
EDUCATION AND LABOR COMMITTEE
U.S. HOUSE OF REPRESENTATIVES

SUBMITTED BY

RACHEL WOBSCHALL
DIRECTOR, GOVERNOR'S INITIATIVE ON TECHNOLOGY
FOR PEOPLE WITH DISABILITIES

STATE OF MINNESOTA,
DEPARTMENT OF TRADE AND
ECONOMIC DEVELOPMENT

June 30, 1988

The members of the Minnesota Governor's Advisory Council on Technology for People with Disabilities support the Technology Related Assistance for Individuals With Disabilities Act of 1988 and appreciates the opportunity to present this testimony on behalf of Minnesota's efforts to provide technology to those who need it.

In October 1985, Governor Rudy Perpich created a task force to investigate the potential of technology to improve the quality of life for Minnesotans with disabilities. His action was based on the conviction that thousands of people could have their lives greatly improved by technology that exists or that has the potential to exist.

Over the next six months the task force explored ways to increase awareness for users, the public and professionals; to provide access to appropriate technology based products and services; and to fund research and development that addressed the critical needs in this field. The following is a summary of their findings:

Introduction

In recent years, there has been a tremendous acceleration in the rate of technological innovation, with new devices and processes being developed that can enhance the daily lives and activities of people with disabilities. An enormous range of technological devices is potentially available to help individuals function more fully in areas such as mobility, communication, and the negotiation and control of their environment. Technological advances are also applicable to educational and vocational programs. For persons with disabilities, the availability of assistive devices or technology-related services can mean the difference between employment or unemployment, independent or dependent living, and the ability or inability to participate in the normal, everyday affairs of a community. Action is needed to ensure that technological devices and services are available and accessible to people with disabilities.

Defination and Incidence

A disability is anything that challenges the development or functioning of an individual, such as sensory, physical, mental, or emotional impairments. Accidents, diseases, congenital defects, and aging are the primary causes of limitations to a person's ability to perform one or more important life functions. The limitations imposed by these conditions range from those easily overcome (e.g., wearing eyeglasses to improve visual acuity) to those for which compensation is more difficult or complicated (e.g., the mobility and routine functioning of a person who is quadriplegic).

According to United Nations estimates, more than 400 million people, or 10 percent of the world's population, are disabled. U.S. Census Bureau statistics indicate that there are about 35 million people in the United States who are disabled. In Minnesota, it has been estimated that 14.5 percent of all Minnesotans are limited in one or more functions of daily living as a result of a disability.

Costs to Society

The costs to society of failing to help persons with disabilities to live full productive lives are high. According to national estimates, between 50 and 80 percent of working-age people with disabilities are unemployed. The poverty level among persons with disabilities has increased to 70 percent of families whose heads of households are disabled and earning less than $10,000 per year, as compared to 60 percent in 1975. The resulting cost to society is estimated at $300 billion per year, or $25,000 to $35,000 in lost wages, lost economic growth, food stamps, and medical payments, as well as workers' compensation and unemployment insurance, for each of the 10 million unemployed people with disabilities in the U.S.

Findings

While technological devices and workplace adaptations can be very expensive, companies are finding that these costs are often far outweighed by the cost of long-term disability payments. In addition to savings in wages earned and lowered workers' compensation and unemployment compensation rates, new technological developments can also bring

about significant cost savings by helping prevent the occurrence of disabling conditions; allowing people with disabilities to live in independent or in semi-independent settings rather than in high-cost institutions; and providing the education and training necessary to enhance the employability of people with disabilities.

A significant gap exists between the possibilities offered by technological devices and processes and the realities of their applications or uses. Some restrictions are purely monetary, resulting in part from the high cost of many technological devices or adaptations relative to functional limitations. Others result from a lack of adequate, available information about technologies for those who could benefit from such knowledge. Still others result from gaps in the process of research and development; that broad area of activity in which needs are identified and products and processes that can meet those needs are developed. All three of these areas must be addressed if disabled Minnesotans are going to be able to fully avail themselves of and benefit from appropriate uses of technology.

A. Information dissemination. Four activities must occur in order for accurate information to be disseminated to appropriate individuals: collection, dissemination, practical application and training. We find, however, that the following is true in Minnesota:

1. There is no systematic effort to gather or disseminate information about existing technologies and their applications. What collection and dissemination is being done is happening sporadically and with no overall coordination.

2. There is no site at which people with disabilities, professionals and concerned others associated with them can have access to equipment in order to assess potentially appropriate uses or applications; and

3. Assistance in selecting and using appropriate devices and processes is not available to all persons with disabilities nor are such services available throughout the state; it is provided only to some in isolated, though excellent, situations.

B. Funding. Financing technological devices and services is an essential prerequisite for their uses. However, current public and private policies and practices are not adequately meeting the funding needs of persons with disabilities, thereby inhibiting their ability to purchase needed devices and rehabilitation services. Specifically, the following problems exist:

1. State agency definitions of key terms, particularly "medical necessity" and "prevailing community standard," are unnecessarily restrictive and therefore prevent or delay full, appropriate uses of technology;

2. Public funding policies do not recognize rehabilitation engineering for conducting assessments needed to select appropriate equipment and to provide training to ensure the full, proper, and safe use of that equipment, and the prior authorization procedure for payments is unnecessarily restrictive; and

3. The definitions of medical necessity used by private insurance carriers that insure the majority of families with children who are handicapped and adults with disabilities are more narrow and more restrictive than those used by public entities. The insurance policies, therefore, do not cover the technologies necessary to remove functional obstacles from the lives of people with disabilities.

C. Research and Development. Introducing new technologies into the lives of people with disabilities is a massive undertaking. Many variables must be considered, such as: the type and severity of disabling condition, the range of specialized technology either currently being used or needing development, as well as the systems and services needed for application. The federal government has a clear role in carrying out and supporting disability-related research and development and setting national research priorities, but their distance from consumers and current funding limitations have diminished the effectiveness of efforts at this level. In many ways, states are in a more appropriate position to address the needs of people with disabilities. In Minnesota, there is at present no consistent effort to do so. Effective disability-related research and development is not taking place in Minnesota because:

1. No effort is underway to identify and document existing technologies and the unmet needs of persons with disabilities;

2. There is no mechanism to disseminate such information to producers and consumers and to encourage ongoing dialogues between them; and

3. Specialized applications for disabled persons are often expensive, but no incentives exist to encourage companies or individuals to develop and/or transfer new and existing technologies and technology uses for that purpose.

Recommendations

Technology offers means to ameliorate the limitations posed by a variety of disabilities. Carefully guided action is required to ensure that appropriate devices and services are available to and accessible by Minnesotans with disabilities. The following recommendations provide the means to take such action and, given sufficient funding and staff support, could be implemented within a two- to three-year time period:

1. An ongoing Advisory Board on Technology for People with Disabilities should be established.

2. A mechanism should be established to gather information on existing technology for persons with disabilities and to dispense it through a central collection site.

3. A statewide media campaign should be developed to heighten public awareness of available technology-based products and services and their implications for persons with disabilities.

4. A sequential strategy should be developed to provide technology-related training to professionals in special education, rehabilitation, county case management, and other areas of caregiving, as well as to families.

5. Public agencies, private insurance carriers, and Health Maintenance Organizations should be required to expand their definitions of medical necessity, to revise their definitions of prevailing community standard, and to provide extended disability insurance coverage.

6. Medical Assistance should be revised so that it encourages, rather than prevents, technological advances.

7. The Medicaid Professional Services Advisory Committee should be expanded to include a subcommittee of persons familiar with new technological devices and services to advise the Department of Human Services on appropriate technology matters.

8. A matching grant program should be enacted by the Legislature to encourage the use of public and private sector funds to support new program alternatives that promote the use of technologies by people with disabilities.

9. Minnesota's Developmental Disabilities Council should study Pennsylvania's Assistive Device Loan Program and evaluate the advisability of proposing a similar program in Minnesota.

10. Grants, tax credits, and other incentives should be established and/or modified to encourage the development, modification, and transfer of technologies to meet the needs of disabled persons and to assist consumers paying for needed devices and services.

11. Assistance should be provided to companies to identify and document needs and existing technologies in order to help them design products usable by and accessible to people with disabilities.

12. A proposal should be developed for a Minnesota Center for Technology for Disabled People that would coordinate, support, and advance technology uses and applications for people with disabilities through implementation and training, information dissemination, technical services, research and development, and technology transfer.

Future Implications

Advanced technology is widely available in general, but its transfer to the special, long-term needs of persons with disabilities has been slow, sporadic and uneven. At the same time, the population of persons with disabilities is increasing. We are at a point where dramatically effective, practical applications could become reality and could be made widely available and accessible. The degree to which this will occur depends on the intensity and effective coordination of information dissemination, funding, and public and private sector research and development efforts.

We cannot afford to pass up the opportunity to utilize technology to its fullest potential in order to help people with disabilities fully participate in our society. Minnesota's economy has prospered from a strong base of technology-intensive firms, an enduring entrepreneurial spirit, a tradition of cooperation, and an abiding concern for our fellow citizens. These same strengths give us the ability to lead the nation in the application of new technologies to the needs of people with disabilities and to focus on the abilities, rather than the disabilities, of those with functional limitations.

The next five to ten years will be crucial to the shape of the future. Action must be taken in the areas of information sharing, funding, and research and development within a carefully conceived strategy that is fully supported with adequate human and financial resources; the costs of doing so will be far outweighed by savings in productivity, economic growth, and human dignity. We can afford to do no less.

Creation of an Advisory Council

Based on the recommendations of this task force, the Minnesota State Legislature appropriated funds for the public policy implementation and continued partnership through the Governor's Advisory Council on Technology for People with Disabilities (Executive Order 86-12), a program of the Office of Science and Technology located in the Department of Trade and Economic Development. The Council is responsible for the development of public policy, the promotion of technology utilization and development, and greater public awareness regarding the potential use of technology for people with disabilities.

Similar interagency experiences can be replicated in other states through a coalition of consumers, producers, third party payors, service providers, education systems, library systems and representatives of state agencies that provide services for the disabled and the aging population. The Technology Related Assistance for Individuals With Disabilities Act makes this possible.

Because providing technology for people with disabilities is a unique combination of products, services, funding, evaluation and training, expertise across a broad range of fields is required. The establishment of Minnesota's Council provides the necessary experience. Through this process each member has a particular expertise, yet they have an ability to focus on the needs of people with disabilities.

When discussing possible solutions, our Council has not lost sight of social, economic and political realities that exist for policymakers, business people, service providers and individuals with disabilities in today's world.

Often discussions expand to include practical problems such as: "We developed an apparatus for Bob so he can reach the top shelf from his wheelchair." "How do we market this to others?" or, "Mary just returned to work after her injury and here's how we've adapted her work station..." or "Paul can only use his index finger on one hand, but with the help of a microcomputer he's able to communicate with his family." The sharing of experience and personal commitment adds an important dimension to the Council's activities. Nowhere else in government do representatives of multinational technology-producing companies and service providers sit with individuals with severe disabilities and really listen with the intent of developing appropriate solutions.

Minnesota's economy has prospered from a strong technology-intensive industry and an outstanding medical-and-rehabilitation community. The Council membership reflects those strengths. An important feature of this Act is that it allows each state the flexibility and autonomy to coordinate and integrate services based on its unique characteristics.

Technology offers a means to compensate for limitations imposed by a variety of disabilities. It is a tool that can be used in all areas of life; in vocational, recreational and educational pursuits as well as in home activities at any point in a person's lifetime.

As a tool involved in a variety of activities throughout a person's life, technology is different from most human service delivery systems. With technology there is no closure, no aging out, and no other defined endpoint; it is a continuous and rapidly changing process, one which requires a coordinated effort to ensure integration into existing systems. The advantage of this legislation is that each state will be able to develop a comprehensive, coordinated state policy by virtue of the key players that are members of Minnesota's Council. These same players have the authority to integrate appropriate technology devices and services into their own agencies' programs and businesses.

State efforts are necessary to ensure that funding mechanisms can respond to the need for technology. Many people with disabilities rely on Title XIX of the Social Security Act for assistance in obtaining medical and rehabilitation services. While there is national criteria regarding eligibility, states retain considerable discretion with regard to who is served, to the scope of service and to the duration of that service. In Minnesota and other states, such discretion has prevented the acquisition of some significant categories of technology, such as augmentative communication devices. The rationale has been that such devices do not serve a medical need even though they serve a very real need for an individual who is speech impaired. The Office of Technology Assessment found that people with disabilities are often denied payment through current patterns of reimbursement because these programs were designed to provide assistance for acute medical problems rather than for the chronic problems faced by people with disabilities. "A significant effect of the current system is that, in the short term, funds may be saved while in the long term a greater amount of total funds is expended." (OTA 1982, p. 179).

Removing such obstacles to functional independence is a medical necessity. An important part of functional independence through the use of technology involves rehabilitation engineering services for conducting assessments needed to select equipment that is most appropriate for individuals and providing the training needed for safe and appropriate use of that equipment.

Often, an individual's needs require a variety of different technologies adapted to his/her unique needs. The skills of rehabilitation engineering are necessary to design an effective system; these services should be reimbursed in both public and private funding mechanisms.

In the area of funding, another crucial issue must be addressed: getting equipment to people with disabilities. As the previous discussion demonstrated, current funding mechanisms do not adequately address the need. Given the fiscal constraints facing most states and the high demand for limited private resources, a key component of any federal legislation will be a grant program that will ensure not only the planning for but the actual delivery of technologies for people with disabilities.

The success of such initiatives is measured by the availability and affordability of this technology to individuals. Success can also be measured by the degree of independence afforded an individual through the use of such technology. Lake Kissick is one such individual.

Lake is a person whose disabilities were so severe that his doctor told his family he would be a vegetable for the remainder of his life. Lake now lives in his own apartment using an electrical wheelchair and communication device. Lake works as a sales person for Prentke - Romich, the company that manufactures the communication device he uses (Kissick 1986).

The Technology Related Assistance for Individuals With Disabilities Act of 1988 creates the incentive for states to gather a coalition of consumers, producers, advocates and professionals, as well as supplying the necessary funding that can be directed toward the acquisition of devices for individuals. This legislation is an important step in helping states provide technology for people with disabilities.

The Minnesota Governor's Advisory Council on Technology for People With Disabilities is pleased to support this legislation and applauds your efforts to make the promise of technology related assistance a reality for individuals with disabilities.

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Statement of

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on

Technology-Related Assistance for Individuals With Disabilities Act of 1988
H.R. 4904

Submitted to the

Subcommittee on Select Education

Committee on Education and Labor

United States House of Representatives

July 12, 1988

Introduction

The Council on Engineering of the American Society of Mechanical Engineers (ASME) is pleased to provide comments on H.R. 4904 to improve the availability, delivery and development of assistive technology to benefit persons with disabilities. This statement represents the views of the Council on Engineering rather than an official position of ASME.

The Council on Engineering is the operating arm of ASME which directs the Society's extensive technical activities, including conferences, publications and research. The breadth of these technical activities cover 34 divisions, four Institutes, three interdisciplinary programs, and one of the world's largest technical publishing operations. The activities of ASME and its members include most of the basic and applied technologies relevant to assistive technologies and mechanical engineers represent the majority of engineers involved in developing and manufacturing assistive technology devices. The Society has a biomedical engineering division, a research Transaction Journal on Bioengineering and a Technology Transfer journal, SOMA: Engineering for the Human Body. In addition, several ASME research committees address the issues related to medical devices and human safety.

Need for Assistive Technology

Despite the current rapid pace of scientific and technological change, the extent of the national efforts devoted to assistive technology for disabled persons is minimal in relation to the need. Today there is not a single accredited program for rehabilitation engineering in American universities.

Over 400 million people in the world have severe impairment and 100 million of them cannot function independently. In the United States alone, there are about 28 million people with some degree of musculoskeletal disability. There are over 29 million people in the U.S. over 65 years of age. The aged represent the fastest growing sector of our population.

In 1985, four billion dollars were spent on rehabilitation and an estimated 11 billion will be spent in 1990. Medical instruments and rehabilitation devices have been identified by the U.S. Department of Commerce as one of the emerging technologies which will have an important impact on the U.S. economy (NBSIR 87-3671 November 1987).

Barriers to Commercialization

Despite the need for assistive technology, there are a variety of factors contributing to the slow progress in commercialization of devices, including:

1. High cost: Many devices are patient specific and must be custom made. The resulting high cost limits their market potential and availability.

2. Specialized skills: A limited number of engineers and scientists currently work in the field. Further, it is difficult to attract and coordinate the interdisciplinary skills, which are needed for equipment innovation.

3. Liability: Product liability laws and health and safety regulations frequently discourage the commercialization of devices and/or significantly increase their cost.

4. Resource integration: The development of devices and delivery systems require integration of resources in Federal, State and municipal governments with those in industry, universities, Federal laboratories, hospitals and clinics.

5. Limited research dollars: Because of the barriers described above, many companies have not been willing or able to commit significant research dollars to assistive technologies. Further, university funded research in the field is largely limited to the availability of Federal research dollars.

Recommendations for Federal Legislation

As an engineering society, our expertise is on the research, development and commercialization aspects rather than financing or program administrative matters. However, we support the objectives of Title I of the bill, "Grants to States." Improving the mechanisms to select and deliver assistive technology devices will not only expand the availability and use of existing technologies, but help to define the market for new technologies.

With respect to standards, we support the concept of developing national standards for assistive technology devices. However, these standards should be developed through a national consensus, voluntary standard approach. Where appropriate, Federal agencies

could reference these voluntary standards as a means of satisfying regulatory or procurement requirements.

We support the authorization of Model Research and Development Projects in Title II of the bill for the conduct of applied R&D projects. Sufficient flexibility should be built into the legislation to allow for alternative approaches to accommodate interdisciplinary research and development as well as cooperative research involving industry, universities, nonprofit organizations and government. We would recommend that provisions also be made in the bill for support of basic research. As the bill now stands, the authorized funding for all of Title II, which includes training, R&D, a loan demonstration project, public awareness projects, and others, bears no relationship to the need. Even if the entire $6 million authorized for Title II went to R&D, it would be totally inadequate.

We also recommend that the bill call for an assessment of research needs for assistive technology by a professional society or other independent organization. Such an assessment would be very helpful for prioritizing research, and would be an important resource for inter-agency cooperative efforts on research.

An assessment of research needs should also be valuable to Congress to help demonstrate the extent of the needs. As indicated in the above discussion on barriers to commercialization, the Federal government is virtually the only source of funding for university research. The current level of Federal funding is not only inadequate for meeting many research needs, but also for attracting and developing sufficient technical talent and facilities for the longer term.

Finally, because liability problems are a serious deterrent to the commercialization of assistive technology devices, we urge Congress to explore alternative approaches to ameliorating this problem.

We appreciate the opportunity to submit our views on proposed assistive technology legislation, and we hope the subcommittee finds our comments to be helpful.

STATEMENT OF

THE COUNCIL FOR EXCEPTIONAL CHILDREN

and

THE TECHNOLOGY AND MEDIA DIVISION

to

THE SUBCOMMITTEE ON SELECT EDUCATION

of the

U.S. HOUSE OF REPRESENTATIVES

with respect to

TECHNOLOGY ASSISTANCE FOR PEOPLE WITH DISABILITIES

MAY, 1988

For further information contact:

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Mr. Chairman:

The following statement is presented on behalf of The Council for Exceptional Children (CEC) and its Technology and Media Division (TAM). The Council for Exceptional Children is the international association of professionals and others involved in and concerned about the education of students with handicaps as well as students who are gifted and talented. TAM is an organization of CEC members devoted to the improvement of research, development, training, and demonstration activities related to the application of technology to exceptional individuals.

We believe that technology can be a powerful tool for improving the quality of life for all people, but most especially those with handicaps. We commend Congress for recognizing the importance of technology over the years. One hundred nine years ago, Congress authorized the establishment of the American Printing House for the Blind, which has been devoted to bringing the technology of the day to sightless persons throughout the nation.

Over the years, efforts of the Library of Congress, the Department of Education in rehabilitation and education, the Veteran's Administration and others have played a major role in advancing technology applications. We particularly want to commend the Congress for the new legislative authority created in 1986, Part G of P.L. 99-457, and we hope that with some modest funding, better educational technology can be developed and made available.

We believe that it is time to take a major step forward. The age of electronic technology has created an opportunity to dramatically improve the lives of persons with handicaps of all ages. We believe that our society cannot afford to miss the opportunity to assure that such persons have access to appropriate technology assistance. While we recognize that there are wide range of issues that need to be addressed, we will focus our comments on educational applications. But we want to convey our support for a more comprehensive view as legislation is developed. Our statement addresses two major issues. First, we will present ways technology assistance can significantly improve educational opportunities for persons with handicaps. In this regard, we strongly believe that education is a lifelong process and that while our examples will focus on children and youth, application should address persons of all ages. Second, we will propose basic principles that any legislation developed should address.

USING TECHNOLOGY TO IMPROVE EDUCATIONAL OPPORTUNITIES FOR PERSONS WITH HANDICAPS

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USING TECHNOLOGY TO IMPROVE EDUCATIONAL OPPORTUNITIES FOR PERSONS WITH HANDICAPS

Improved educational opportunities have accrued for persons with handicaps through the application of technology to improve their ability to: a) learn, b) actively participate in an education environment, and c) apply newly learned information across environments.

a) Technology As a Learning Tool

As a tool to improve the learning of persons with handicaps, technology is an exciting and inescapable feature of modern life. It is becoming a more accessible and integral part of teaching handicapped persons. According to Budoff, Thormann, and Gras (1984), the advantages of using technology to teach persons with handicaps include:

1) Individualization and self-pacing: With well-programmed Computer Assisted Instruction (CAI), students work at their own pace with material that meets their specific needs. In addition, rate of presentation and response may be regulated for each student.

2) Immediate feedback: Students receive immediate feedback about their performance.

3) Consistent correction procedures: Students with handicaps are often confused by corrections that are too wordy. CAI can provide specific, consistent correction of errors.

4) Repetition without pressure: Since the computer is emotionless and infinitely patient, repetitive tasks may not be aversive or embarrassing for the student, but indicative of mastery. This is particularly important for slow-learning students who do not experience success in academic tasks frequently or easily.

5) Immediate reinforcement for correct responses: The software provides immediate positive reinforcement for correct answers, which motivates students.

6) Well-sequenced instruction: A task may be analyzed, broken down into manageable steps, and then programmed. Special education teachers often do not have the training or time to construct the consistent, well-sequenced instruction that most handicapped students need, and that good software can provide.

7) High frequency of student response: If the interactive features of the computer are put to full use, students get more practice solving problems than they do working in large groups or with work sheets.

8) Repeated demonstration of mastery of academic subject matter: A sense of mastery of subject matter, especially academic subject matter, is very important to students who have experienced and continue to experience failure in instruction. The computer allows them to review their earlier attainments and recall them. The students can demonstrate to themselves and others their competence in academic subjects. These ego boosts can be critical at times of frustration. The special education student can be "in control of" his learning.

9) Motivation: This can be described at two levels. Many students with handicaps are excited by working on a computer, even doing class work. For others, it is an excellent motivator to allow time for computer games as a reward for work completed. Earning computer time may result in more focused and concentrated work by easily frustrated students who produce slowly or not at all in their usual assignments.

10) Minimize disabilities: The computer enables the poor or inefficient learner to minimize or circumvent significant barriers to learning. Students who are able to understand basic math concepts but unable to do error-free calculations (due to poor memory, visual, perceptual, or other problems) can manipulate numbers and letters with greater ease and accuracy in an interactive mode. Their reasoning abilities can be expressed without interference from their problems in producing output. Using the computer as a work processor may help a special education student bypass writing, spelling, and language arts problems by allowing the student to edit and revise work easily. The time and energy formerly spent on laborious rewriting of rough drafts can be spent developing ideas in a legible and acceptable form. The ready availability of spelling or punctuation checking programs can pit the child against himself. The computer motivates him to reduce spelling or other writing errors, since he can chart his errors after each attempt to reduce them. Most important, the child unable to produce acceptable work can demonstrate his productivity to himself and others.

A substantial amount of information is available documenting the positive effects of technology on the learning of persons with handicaps (Behrmann, 1984; Budoff, Thorman, & Gras, 1984; Cain & Taber, 1988; Carmen & Kosberg, 1982, Cartwright & Hall, 1974;

Goldenberg, 1979; Hartley, 1977; Hasselbring, 1982; Haus, 1983; Jamison, Suppes, & Wells, 1974; Kulik, Bangert, & Williams, 1983; Rieth & Polsgrove, 1983). In addition to the professional literature, there are personal vignettes I would like to share that poignantly illustrate the power of technology to improve the learning, self concept and motivation of persons with handicaps.

- A group of high school students with mental retardation enrolled in an inner city high school in Indianapolis, Indiana who, despite being classified as 10th, 11th and 12th graders, had achievement levels between 2nd and 3rd grade level. Most of the students had long histories of school failure despite their assignment to special education programs. Many attended school only about 50% of the time. Early in the school year they were provided a modified learning and instructional program that included computer-based instruction to assist students in learning basic math facts, basic reading skills and spelling skills. We also used computer games to motivate students to accurately complete paper and pencil assignments. Within one month, all the students were attending school every day and were not cutting classes. Within two months, the students were submitting all assignments on time and were not failing any subjects. By the end of the year, the students had increased their achievement in math and reading an average of 2.5 grade levels and none of the students dropped out. Students who remained in the program for a second year also increased their achievement an additional 2.5 grade levels. Thus, in two years, the students had tripled their rates of achievement due to excellent teaching, good instructional and behavioral management strategies, and the use of computers.

- Another study, included 20 high school students with handicaps who were unable to learn basic addition, subtraction, multiplication, and division facts. Many of these students had been working on the same facts since third grade. By this time, they had resigned themselves to failure and showed very little interest in continuing to work on this material. The average student completed about 20 math problems every half-hour. Once computer-based math drill and practice began, the students increased their work speed to an average of 10 problems correct per minute. After four weeks of starting computer-based instruction, the students standardized math achievement test scores increased an average of two full grade levels.

- Recently, computers were used to teach a group of 40 junior high school students with learning disabilities from the Metropolitan Nashville, Tennessee Schools who had great difficulty learning basic math operations. Computer games were made accessible based on meeting negotiated performance criteria. Tommy, made rapid progress and was elated with his achievement. When asked what he liked best about working with the computer, he responded with a wide grin and said, "it makes me feel like a genius".

These vignettes highlight the power of technology to transform the lives of persons with handicaps. In addition, there is substantial research to support the impact of technology on the learning of students with handicaps. In this next section, we will briefly review information highlighting the effectiveness of technology to enable students with handicaps to increase their rate of learning.

Knowledge Base

Microcomputers have been used in special education for the past nine years and research indicates that the number of computers being placed in special education classes is rapidly increasing (Becker, 1986; Cosden & Semmel, 1987). By far, the most common use of the microcomputer in special education is to develop proficiency in the basic academic skills of math, reading, spelling, and writing(Becker, 1986; Cosden & Semmel, 1987; Okolo, Rieth, & Bahr, in press; Rieth, Bahr, Polsgrove, Okolo, & Eckert, 1987; Russell, 1986). Experts, such as Lesgold (1983) and Torgesen (1984), believe that drill and practice is required to enable children with handicaps to attain fluency in basic academic skills. They argue that special education students do poorly in reading and math because they may have failed to master basic skills. Making these basic skills fluent and automatic requires extensive practice for which the microcomputer is ideally suited.

Math

For years, educators have argued that, in order to fluently recall math facts, students must be provided with many opportunities to practice these facts. More recently, the computer has emerged as one way of providing students with large amounts of extended practice (Gagne, 1983). Virtually all of the studies investigating the efficacy of math drill and practice software have found that fluency has increased on the problems that the students practiced. Trifiletti, Frith, and Armstrong (1984) analyzed the effects of math drill plus tutoring on a group of students with handicaps proficiency with unknown math facts. They found that 40 minutes of computerized tutoring plus drill per day was more than twice as effective as an equivalent amount of teacher delivered math instruction. Hasselbring, Goin,

and Bransford (1987) examined the effect of tutoring plus drill on the math performance of a group of 150 students with learning disabilities. They reported that after only 49 days of instruction on math software, a computer instruction group increased the number of facts recalled by 73% over their pretest score. During the same period, a non-computer contrast group showed no change on the number of facts that they could recall from memory. Kelly, Carnine, Gersten, and Grossen (1986) examined the efficacy of using a videodisc to teach fractions to a group of high school students with mild handicaps. They concluded that the videodisc was an effective teaching tool that can be used to demonstrate concepts clearly and is substantially less labor intensive than teacher-based instruction.

Reading

There is growing consensus that the primary reading difficulty experienced by students with mild handicaps is at the word, rather than the text level of processing. Thus, students with mild handicaps require instruction designed to increase fluent and efficient word recognition. Jones and Torgesen (1987) found that computer-based instruction enabled students to increase their reading speed by 26% versus a 4% increase for students taught by teacher-based instruction. The computer-based instructional group increased their accuracy by 20% while the teacher-based instructional group demonstrated only a 5% increase. Johnson, Carnine, and Gersten (1986) reported that computer-based instruction was an effective method of efficiently and effectively teaching reading vocabulary. Jones, Torgesen, and Sexton (1987) used a computer-based reading program for 15 minutes per day over a ten week period to teach reading skills to a group of students with handicaps. They found that it resulted in a 27% increase in reading speed. More impressively, the students receiving the computer practice showed a simultaneous 20% increase in accuracy on a generalized word list that was never practiced during the training. Roth and Beck (1984) examined the effect of computer-based practice on reading decoding and found that students using computers increased their reading speed by 17% while a contrast group who did not receive computer instruction produced only a 3% increase in their reading speed. Similarly, Spring and Erry (in press) reported that well designed computer-based training of reading decoding skills increased the fluency of students with mild handicaps.

Spelling

Teague, Wilson, and Teague (1984) worked with a group of young students with mild handicaps to compare the efficacy of computer-based spelling instruction with traditional spelling instruction. The results indicated that the students made significantly more improvement when computer-based instruction was used. In a series of studies, Hasselbring (1982, 1984)

reported that "voice presentation" of words via computer in combination with imitation plus modeling feedback was successful in developing high levels of spelling accuracy by such students. It was also found that this approach was significantly better than traditional spelling instruction. Rieth, Bahr, McCarthy, & Polsgrove (in preparation) used a computer linked DEC TALK coupled with a distributed practice study procedure to increase the weekly spelling test scores attained by a group of 15 students with handicaps by 40% over pretest scores.

Writing

Morocco and Neuman (1987) conducted a two year observation study investigating the use of word processors to teach writing to learners with mild handicaps. They concluded that procedural writing instruction coupled with computer instruction was the most successful technique for teaching writing to these learners.

Ellis (1986) compared student writing under three conditions: (a) handwriting, (b) word processor, and (c) word processor plus idea processor (outlining program). Following strategy training, the students' writing improved under all three conditions with the word processor showing the best results.

Problem Solving

Maddux (1984), Schiffman, Tobin, and Buchanan (1982), Russell (1986) have suggested that the computer is a powerful tool for the development of thinking and problem solving in students with learning disabilities. Probably the most publicized way of developing problem solving skills has been through the use of interactive programming languages, the most prominent being LOGO. Turkel and Podell (1984) used LOGO Turtle Graphics to teach thinking and problem-solving to eight students with mild handicaps. Students employed mathematical concepts such as estimation of distances, angles, plotting points on a grid, spatial awareness, and sequencing. Also, students had to find and correct errors in programs. They found that the students were generally focused, systematic in their problem-solving behavior, organized, on-task, logical, and they appeared motivated. Woodward, Carnine, and Collins (1986) used simulations to teach health-related problem-solving skills. They reported that the simulation group was superior to the conventional group on measures of problem solving in the areas of diagnosing health problems, prioritizing them regarding their effects on a person's longevity, and prescribing appropriate remedies. Collins, Carnine and Gersten (1987) reported good success in using computer-based instruction to teach high school students with handicaps to draw conclusions from two statements of evidence and to determine whether a two statement argument was logical. Despite the evidence that technology is effective in assisting these students to learn, there is additional research

and development that must be done to increase our knowledge of how to most effectively use this powerful tool. Simultaneously, we must strive to develop new and more sophisticated applications to assist persons with handicaps. In the following section, I will briefly highlight some of the more pressing needs for additional research and development.

Research and Development Needs

Despite the ready availability and the efficacy of computers as teaching and learning tools, many teachers are not using computers to teach students with handicaps (Rieth et al., 1987). Research must investigate factors such as the lack of educationally sound software, logistical problems in scheduling microcomputer use, and the lack of teacher training and support that contribute to the limited use. We must conduct additional research to determine the conditions which facilitate the widespread adoption and diffusion of technology among special educators. Teachers still primarily use computers for math, reading, spelling, and writing instruction. Therefore, further studies are needed to identify additional applications in these areas as well as the areas of science and social studies. We need to know more about the instructional features of software that will influence student learning. Given the finite resources available to purchase additional machines, we must learn whether students can be grouped for computer-based instruction, how the groups should be composed and how student performance while working in groups should be evaluated. In the area of problem solving we have just begun to develop a knowledge base that will guide important research.

b) Technology to Improve Functioning in Educational Environments

Technology is also a tool that can be used to make the learning environment more accessible and enhance individual productivity. Computer technology as a tool for children to access educational environments can be divided into four general categories: 1) a learning (academic) tool, 2) a living tool, 3) a vocational tool, and 4) a recreational tool.

The Computer as a Learning (Academic) Tool

As described earlier, computers are powerful instructional tools. To use the tools, one must be able to access the environment. For example, technology can facilitate access. Students with handicaps can use telecommunications to access essential learning information. Wheelchairs are now equipped with microprocessors enabling persons with handicaps greater access to schools.

Communication devices enable students, heretofore unable to communicate in school, to interact with teachers and their peers. Spoken text allows individuals with visual handicaps or those with severe reading deficits to use word processing.

The Computer as a Living Tool

Computers can facilitate daily living activities in a broad array of environments. For children with multiple handicaps, the computer can be used to manipulate the environment by controlling tape recorders, electrical appliances and robots capable of manipulating food and drink. Voice synthesizers and communication software packages allow non-verbal children to talk to teachers and peers. Children with visual impairments can read written material with optical scanners and synthesizers as well as access electronic media such as electronic encyclopedias. Children with handicaps can interact with other children using telecommunications. Word processing, spread sheets, and database productivity tools can assist in communication, solving math problems, learning to balance a checkbook and home living skills (e.g. retrieving recipes).

The Computer as a Vocational Tool

Computers are being used extensively in schools to prepare students for future vocational settings. Our society is changing from an industrial base to an information base. Cottage industries specializing in information manipulation are increasing in number and the manufacturing industry is rapidly developing a technological base. Technology allows persons with handicaps to participate in this transformation.

Just as technology can be adapted to allow most students to use a word processor to satisfy academic and communication needs in school, it can also be adapted to provide access to learning vocational applications. Technology manufacturers such as Apple and IBM include design parameters in new equipment that ensure that individuals with a disability can utilize standardized interfaces. Robotic workstations have been developed at such companies as Boeing Industries to enable quadriplegic employees to continue with their jobs. For individuals who are difficult to integrate into the work setting, telecommunication offers an option of working at home or in a smaller cottage industry better suited to meet the needs of individuals with a disability. Services such as mailing lists, data bases, etc. can be maintained by children and youth who have the capability of learning the skills necessary to be productive yet need special medical or other assistance.

Computers as Recreation and Leisure Tools

Play, recreation, and leisure are important parts of the learning process and technology can provide more normalized access to these activities. For example, socialization is enhanced through telecommunications. Auto dialers can easily contact friends and augmentative communication devices can support direct one to one interactions. Graphics packages for drawing and color printers to make hard copy allow access to art. This software can be accessed using adapted devices allowing a child who cannot hold a crayon or a child with limited cognitive ability or perceptual motor dysfunctions to express themselves by drawing. Synthesizers can enable a child unable to use a piano keyboard to compose music and explore music and sound. Popular video games such as "Super Mario Brothers" and "Pac Man" become accessible with adapted devices and electronic control over the speed of the computer.

Empowering Students Through Technology

In order to enable children with handicaps to utilize these new and powerful tools to access educational opportunities it is necessary to provide appropriate training and easy access to technology. For students with handicaps, particularly those with higher cognitive functioning, we need to emphasize access to systems in our educational environments, with the primary emphasis on allowing them to utilize minimally adapted commercially available computer hardware and software.

- The following vignette is presented to illustrate technology's capacity to foster environmental access. Michael is a wheelchair-bound nine year old with cerebral palsy. He is quadriplegic and has physiologically inadequate speech production mechanisms. In spite of these physical impairments, Michael's parents and teachers were convinced of his cognitive potential. Their faith in his ability has proved to be well founded. For the past six months Michael has been using a microelectric augmentative communication system with synthesized voice and printed output. Until he had access to this technology, Michael could not "talk," write, or read. Now with the help of a simple word processing system and a complex message system, he can do all three. In the past, Michael was disenfranchised and largely disengaged at school. Now he is engaged in communication, language, and literacy learning. He has learned to use his school's electronic mail and bulletin board system to send messages to other students and others. And, for the past month, Michael has enjoyed communicating with Linda, who like Michael, recently moved from a beach community on Cape Cod to the Great Plains. Linda, who has a hearing impairment, and Michael love to reminisce, and they have both learned to

write about sand dunes, surf at high tide, and lobster tails. In fact, they have co-authored an essay, "Surf and Sand," for their schools desktop publication, Essays About Our Country.

Knowledge Base

Taber (1984) identified five significant freedoms which would accrue to individuals with special needs through the effective use of technology. These include the efficient and effective use of time, the enhancement of learning processes and outcomes, greater environmental independence, and meaningful involvement in gainful employment. Such primary achievements can be expected from the judicious applications of technology on behalf of those with special needs, and each relate directly to the enhancement of communication - Taber's fifth freedom.

Access to Academics

Gregg Vanderheiden, in his article "Computers Can Play a Dual Role for Disabled Individuals" (BYTE, September, 1982) suggested: "... the immediate future promises to be an extremely exciting and productive period, which will see rapid advances in the development of both special function programs and new strategies to ensure the complete access to disabled individuals to the world of microcomputers."

If this access can be assured, then the functional disabilities currently experienced by these individuals should decrease markedly as our society moves more and more into the electronic information age. If we fail to ensure access to our computer and information-processing systems for individuals with handicaps our progress into the electronic information age will only present new barriers.

Access to Living Skills

Communication is perhaps the single most important access in educational environments. Communication is required for interacting in the classroom. Voice synthesizers allow the nonverbal person greater access to active learning opportunities by providing opportunities to interact.

Before electronic and computer technologies, the written and oral communication of students with severe handicaps was mostly limited to pointing, head shaking, and eye gazing. Interpreters would express in their own words what they thought the student intended. Now computers enable nonverbal individuals to more clearly express their thoughts through written and spoken language.

Appropriate software can enable persons with handicaps to gain control of TV, VCRs, stereos and lights. Training for environmental control can begin at an early age with the use of devices that control battery operated toys such as the Omnibox (Lahm & Behrmann, 1986). New research and development in the field of robotics has generated excitement in the field of special education. For example, robotic arms, controlled by an individual can perform routine daily tasks such as feeding, magazine reading and telephoning.

Access to Vocational Activities

Microcomputers are being used in the vocational training curriculum and are benefiting persons with handicaps by: a) bringing assistance to individuals for less cost, b) allowing access to information available to non-handicapped peers, and c) developing intelligent prostheses that help off-set the information processing problems of the student (Vanderheiden, 1983). Speech recognition is an example of improved access (Rizer & Hiner, 1985). While many adults with handicaps have some keyboard skills through the use of single fingers or head pointers, the process is long, tiresome, and difficult to execute simultaneous key presses such as shift-A for capitalization. Transparent speech recognition systems allow concurrent keyboard and voice entry for virtually all software programs giving the person who is severely motorically handicapped, but verbal, access to all software and electronic information typically available to non-handicapped persons.

Rehabilitation centers have typically employed four job training approaches. They include a) computer learning for information access and general office job skills, b) specialized environments for computer programmers, c) specialized equipment as sensory aids, and d) software-based assessment and training. The first approach was used by Holleman (1986) to train college students with disability on standard computer software for personal and job use. A computer learning center was established through continuing education that has adopted an open entry/open exit policy. This allowed the students to learn at their own pace on a schedule that meets their needs. Assistants, adaptive equipment (e.g. braillers, voice synthesizers) and sign interpreters are always available to make the technology accessible. Skills learned can be transferred directly to a number of jobs and will enable students to continue to access new information through the computer.

The University of Maine at Orono has established a rehabilitation project in data processing to train students with disability to become business applications computer programmers (White & Cormier, 1986). To achieve their goal, they have simulated a business-like environment to conduct their training. Although the costs are high, they have found the project to be cost effective.

Access to Play and Recreation

Play is believed to encourage intellectual, physical, and social growth. Play adaptations, specific skill training, and environmental modifications have been suggested as ways to enhance the leisure activities of children with handicaps (Haring, 1985; Murphy, Carr, & Calias, 1986 Nietupski, Hamre-Nietupski, & Ayres, 1984). It is apparent, however, that current advances in technology may also assist youngsters with special needs to participate in recreational activities. Such advances include the use of communication enhancement devices, prosthetic devices, and electronic toys and robots.

Considering the impact that electronic technology is having on our entire society, it is not surprising that a similar effect is seen in the use of toys. Many electronic toys are based on recent advances in computerization. Steven Kanor is an engineer who has spent many years adapting commercially available toys to meet the operating needs of children with handicaps. His adaptations are based on each child's movement capabilities which are matched to electro-mechanical switches. After identifying the movement that is most appropriate for the youngster, Kanor designs a switch which can control a variety of adapted toys or other electronic devices. Available switches include those that are controlled by touch, light, voice, movement, position, and other stimuli.

c) Using Technology To Transfer Skills To New Settings

Technology can promote the transfer of new skills to related skills and to new settings. Generalization refers to the number of content areas, behavior, and situations affected by the initial instruction (Keogh & Glover, 1980). Methods for achieving generalization have been defined and are considered critical for education (Stokes & Baer, 1977). This section will illustrate ways that technology can serve as a tool for generalization and report research findings related to this topic.

Technology as a Tool for Generalization Across Settings

The goal of education is for skills initially learned in one context (e.g. classroom) to be used in many different contexts(e.g. home, community, employment, recreational settings). One way to reach this goal is to provide technology assistance to the students in these non-school environments. For example, a student with physical disabilities learns to use word processing in a language arts class. This same student can use word processing skills at home for personal correspondence, to obtain a job, or for creative writing as a leisure skill. These outcomes are premised on the availability of a computer system where the person lives and works. Newly learned skills would be

more likely to transfer to different settings because of the technology which becomes a common tool for the pursuit of various goals.

Technology as a Tool for Generalization Across Skills.

An illustration of how technology can serve as a tool for generalization can be seen, for example with a student named Billy. Billy is presently enrolled in a regular third grade classroom with resource room instruction for his core academics. He is ten years old with physical disabilities which primarily affect his ability to write. He also has poor vision and requires large print books. Before the introduction of technology, Billy was a non-reader and his writing attempts were illegible. After training in the use of a computer and a word processing program, Billy completes class assignments and generates creative stories. Many aspects of his learning have improved as a function of his newly acquired word processing skills, such as his reading skills which have improved to the second grade level (LeFave-Ferrara, 1988).

Knowledge Base

Working with infants and young children, Behrmann and Lahm (1983) have shown that microcomputers can provide infants having limited motor abilities with the consistent control of their environment necessary for normal concept development. These researchers suggest that this environmental control should, in turn, affect language, self-concept development, communication, and social interactions. Kehr, Morrison, and Howard (1986) provided technology assistance to young children who were so physically limited that they could not play with conventional toys. By programming board games into software that is single switch activated and has synthesized speech, the children became independent in play, had increased opportunities to socialize, and also could accurately indicate their choices within that play. Improved self-esteem, mastery of part of the environment, and opportunities to develop cognitive and social skills were the major benefits achieved through computer use with those children. Other positive side effects of computer use with preschoolers has been interaction with their non-handicapped peers. Dickson (1986) found computers to be two or three times more effective at encouraging social interaction than more traditional social activities, such as snack time and playacting.

Trachtman (1984) reports that Drs. Meyers and Rosegrant used the speech synthesis capabilities of the computer in language training and found that many children who began to speak through the computer's voice rapidly started speaking themselves. This spontaneous language was not a direct goal of the program but represented the gains sometimes seen when young children are introduced to this medium.

Generalized effects have also been observed with respect to academic skills. Chiang (1986) reported transfer effects of microcomputer drills on the multiplication skills of students with learning disabilities to conventional paper and pencil tasks. Gains were significant after only a short period (i.e. 12 days) of computer use.

Two types of generalization were illustrated in the research of Farr, Hummel, Jadd, and Stein (1985). They developed a communications prothesis consisting of a morse writer system for an eight year old child with spastic quadriplegia. Generalization across skills was observed from the child's reading program to his spelling program. Generalization across settings was observed among school, home, and private therapy environments. Beneficial effects of computers that spread across related skills were also observed in participants of the Comprehensive Training and Employment Project in Hawaii (Peet, 1985). This project is an example of a post-secondary program which provided technology assistance to persons with developmental disabilities. In addition to learning to master business level word processing, the program participants learned decoding skills (reading texts they word processed) and encoding written language (creating and printing texts).

In addition to increasing skills, the computer has been shown to have a positive effect on the reduction of behavior that interferes with learning. Plienis and Romanczyk (1985) conducted a comparison study of instruction delivered by adults and instruction delivered by the computer to teach a discrimination task to severely disturbed children. These researchers found that both methods were equally effective with respect to learning the task. However, the children exhibited more deviant behavior when the adult provided the instruction. Thus, a positive side effect of the computer instruction was a reduction in levels of disruptive and self-stimulatory behaviors.

A similar effect was observed by Lewis, Nail, Henschel, and Panyan (1988) who found that the use of a communication system consisting of a microcomputer, speech synthesizer, and touch tablet resulted in fewer inappropriate behaviors than the use of a language board alone. The training objective was to increase communication which was facilitated by use of the microcomputer system. Inappropriate behaviors were monitored but not directly treated in this study. Thus the improvements in the behavior can be viewed as generalization across skills as a result of the communication training with the computer system.

In conclusion, various forms of generalization have been observed in studies of technology applications in special education. Many studies report gains and growth beyond the skill(s) which was a direct focus of the investigation. By far, the consistent finding across ages was improved self-esteem (Kehr, Morrison, &

Howard, 1986; Peet, 1985). Other authors have commented on the heightened motivation associated with using the computer for learning (Thorman, Gersten, Moore, & Mornat,1986; Trachtman, 1984). Future technology applications should incorporate provisions for generalization across skills and settings so that even more efficient and effective learning may occur.

BASIC PRINCIPLES FOR LEGISLATION

1. CEC and TAM would like to offer the following principles which we believe should guide the development of comprehensive legislation in the area of technology for persons with handicaps: We recommend focusing the legislation on technology assistance rather than assistive technology. The focus on technology assistance will provide a mechanism to allow a wide range of services and research on the use of technology to assist persons with handicaps of all ages gain access to the advantages of technology for learning, living, working, and recreating. We propose the following definitions:

   (A) Technology assistance means providing to individuals who have handicaps and/or disabilities any or all of the following:

      (1) information about products which are electronically operated, including microchip-based and integrated telecommunication systems, and other products which assist persons with handicaps and/or disabilities to utilize electronically operated products;

      (2) help in locating persons or public or private entities that can develop or modify such products to meet the needs of such individuals;

      (3) help in establishing or locating support systems which facilitate the effective use of such products, including but not limited to needs assessment, prescription, and customization of the product(s) and training in procedures for using the product(s);

      (4) help in finding funding sources that can be accessed to purchase such products;

      (5) help in maintaining and upgrading such products;

      (6) purchasing such products.

(B) Persons with handicaps and/or disabilities who could benefit from technology assistance are:

(1) persons who are eligible for special education and related services or early intervention services under the Education of the Handicapped Act; persons who are eligible for services under Titles I, VI, VII of the Rehabilitation ACT; persons with rights under Title V of the Rehabilitation Act; persons who are eligible for assistance under Titles II and XVI of the Social Security Act; and/or persons who are eligible for assistance under the Developmental Disabilities Act; and

(2) who could benefit from technological assistance which is likely to establish or improve their ability to function at home, in school, in the community, in recreational settings, on the job, and/or in other environments.

2. Many forms of technology enable individuals to communicate, learn, work, and recreate in a variety of new ways. When these advantages are limited to one setting, the power of the technology is greatly diminished both for the person and for the community. Therefore, any legislation must recognize and address the need for technology to be as transportable as possible so that persons can use it in as many situations as their life demands.

3. Technology is a powerful and robust tool that can assist persons regardless of age, type or severity of handicap. This breadth of application, however, creates problems in developing and implementing policies that foster responsible programs and services for a highly heterogenous population with diverse needs for technology assistance. Legislation must, therefore, respond on the one hand to the broad range of human needs that requires an array of frequently unique technology applications and on the other hand provide sufficient time and resources that will enable development and implementation of programs and services that responsibly serve a very diverse population.

4. There is a growing need for service delivery systems, either current or planned, to respond to requests for technology assistance. At the same time that there is systemic response to the need (i.e., individuals have a clear entry point to technology services), the response must be designed for each individual, not standardized for all individuals.

5. Research and development are essential for the advancement of technology and its application. To date, research has demonstrated that technology can be a powerful learning tool. Additional research is required, however, to identify new technologies and to expand our knowledge about the application and integration of technology as a learning tool. As new technology emerges, we must develop and adapt applications for assisting persons with handicaps. Therefore, we strongly recommend that any legislation contain provisions to authorize the state and federal governments the authority to fund competitively awarded research and development grants related to technology applications for persons with handicaps.

6. Education is lifelong. P.L. 99-457 has already expanded special education intervention to birth and transition programs are developing to assist persons move from schools to the world of work. Society is moving from an industrial base to an information base illustrating that new knowledge and skills are necessary for maintaining a productive life. Therefore, this legislation must recognize the important role of education throughout the lifespan from birth to the grave.

7. While legislation should appropriately contain minimum criteria, it is essential, however, that the criteria be sufficiently flexible to accommodate variation among the programs and services offered by different states and the diverse and sometimes idiosyncratic technology assistance needs required by individual states.

8. Federal Role. The federal government has a number of critical roles it must play beyond helping states. We recommend that the federal government:

   a. Coordinate and monitor common features among the states to reduce duplication of efforts (e.g., software resource guides).

   b. Assist in the process of evaluating and certifying hardware and software products developed to provide technology assistance.

   c. Fund competitively awarded grants to prepare personnel to assist in the development and delivery of technology assistance. There is a continuing need to prepare personnel to competently employ technology to assist persons with handicaps to learn, work, communicate, or recreate.

d. Fund competitively awarded grants to agencies to demonstrate exemplary applications of technology assistance and systems for delivering technology assistance services. The purpose is to foster the development of model programs and applications that can be replicated across states.

e. Fund competitively awarded research and development grants in the area of technology assistance. The purpose is to identify new technologies and to develop new technology applications.

f. Encourage through incentives private sector development and marketing of technology and technology products.

g. Not develop overly prescriptive regulations that provide a disincentive to private sector firms interested in developing and marketing hardware and software devices or technology assistance delivery systems. The private sector must be an ally in the development and creation of systems to deliver technology assistance to persons with handicaps.

9. The ultimate success of technology for persons with handicaps is dependent on their participation in the selection and adoption of the system. Consumers should be members of Advisory Councils and in other leadership and decision-making roles pertaining to the provision of technology assistance.

Mr. Chairman, we thank you for the opportunity to submit this statement and we stand ready to assist you and the Committee as you develop legislation on this most important issue.

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Congress of the United States

House of Representatives

Washington, DC 20515

STATEMENT BY CONGRESSMAN STEVE BARTLETT

JUNE 30, 1988

HEARING ON H.R. 4904, THE TECHNOLOGY-RELATED ASSISTANCE

FOR INDIVIDUALS WITH DISABILITIES ACT

I COMMEND CONGRESSMAN OWENS FOR HOLDING THESE HEARINGS ON H.R. 4904, THE TECHNOLOGY-RELATED ASSISTANCE FOR INDIVIDUALS WITH DISABILITIES ACT. RARELY DO WE FIND IN THE CONGRESS AN ISSUE THAT MEMBERS, BOTH DEMOCRAT AND REPUBLICAN, AND A MAJORITY OF GROUPS IN THE DISABILITY COMMUNITY, CAN SUPPORT. H.R. 4904 COULD BE THAT BILL. THIS LEGISLATION WILL PROVIDE INDIVIDUALS WITH DISABILITIES INCREASED EMPLOYMENT AND EDUCATIONAL OPPORTUNITIES ALLOWING THEM TO BE MORE INDEPENDENT. H.R. 4904 MAKES A SMALL INVESTMENT WHICH WILL RESULT IN A LARGE RETURN.

FOR MOST OF US, TECHNOLOGY MAKES THINGS EASIER, BUT FOR DISABLED PERSONS, TECHNOLOGY MAKES THINGS POSSIBLE. TECHNOLOGY EXISTS BUT IT IS NEITHER WIDELY ACCESSIBLE NOR WIDELY KNOWN.

LACK OF INFORMATION AND ACCESS TO TECHNOLOGY CAN HAVE A DRAMATIC IMPACT ON A DISABLED PERSON'S LIFE. TECHNOLOGY CAN THEORETICALLY PROVIDE EYES FOR THE BLIND, EARS FOR THE DEAF, AND HANDS FOR THE PARALYZED. ASSISTIVE TECHNOLOGY DEVICES AND SERVICES CAN PROVIDE INDIVIDUALS WITH DISABILITIES THE NECESSARY TOOLS TO FUNCTION MORE INDEPENDENTLY AT SCHOOL, WORK, AND HOME, AND TO HAVE MORE DIRECT CONTROL OVER THEIR OWN ENVIRONMENT. THE PROBLEM IS GETTING THIS TECHNOLOGY TO EVERY DISABLED PERSON THAT WANTS IT AND CAN BENEFIT FROM IT.

ON MAY 10, 1988, THE SUBCOMMITTEE ON SELECT EDUCATION HELD HEARINGS ON THE IMPACT TECHNOLOGY CAN HAVE ON A DISABLED PERSON'S LIFE. ONE WITNESS, TOMMY DORMER, A NINE-YEAR OLD WITH CEREBRAL PALSY WHO IS NON-VERBAL DEMONSTRATED A PIECE OF TECHNOLOGY THAT ALLOWS HIM TO COMMUNICATE. BEFORE OBTAINING THIS DEVICE, TOMMY COULD NOT VERBALLY EXPRESS HIS THOUGHTS AND FEELINGS TO ANYONE.

I ASKED TOMMY'S MOTHER IF SHE LOOKED THROUGH A CATALOGUE OR HAD THE OPPORTUNITY TO SEE SEVERAL DIFFERENT PIECES OF TECHNOLOGY BEFORE CHOOSING THIS PARTICULAR DEVICE. MRS. DORMER RESPONDED THAT THIS WAS THE ONLY DEVICE RECOMMENDED BY THE SCHOOL COUNSELOR. SHE DID NOT LOOK THROUGH A CATALOGUE OR TEST OTHER ALTERNATIVE DEVICES TO DETERMINE THE BEST DEVICE FOR TOMMY. MRS. DORMER WAS ONLY GIVEN ONE CHOICE.

THE GOOD NEWS IS THAT TOMMY HAS A PIECE OF TECHNOLOGY THAT ALLOWS HIM TO COMMUNICATE. THE BAD NEWS IS THAT MRS. DORMER DID NOT HAVE AN OPPORTUNITY TO LOOK AT SEVERAL DIFFERENT DEVICES THAT MAY HAVE BETTER MET TOMMY'S NEEDS. H.R. 4904 WILL GIVE INDIVIDUALS WITH DISABILITIES, PARENTS, SERVICE PROVIDERS AND PROFESSIONALS ACCESS TO INFORMATION ABOUT ALL AVAILABLE ASSISTIVE TECHNOLOGY DEVICES AND SERVICES. H.R. 4904 WILL PROVIDE CHOICES.

H.R. 4904 WILL BE A CATALYST FOR INCREASING THE AVAILABILITY OF AND FUNDING, BOTH PUBLIC AND PRIVATE, FOR ASSISTIVE TECHNOLOGY DEVICES AND SERVICES PRIMARILY THROUGH A STATE GRANT PROGRAM. THE PURPOSE OF THE STATE GRANT PROGRAM IS TO ASSIST STATES TO DEVELOP AND IMPLEMENT CONSUMER-RESPONSIVE STATEWIDE PROGRAMS OF TECHNOLOGY-RELATED ASSISTANCE FOR INDIVIDUALS WITH DISABILITIES SO THAT SUCH INDIVIDUALS MAY ACQUIRE INFORMATION ABOUT AND OBTAIN ASSISTIVE TECHNOLOGY DEVICES AND SERVICES.

TITLE II OF THE BILL AUTHORIZES A SERIES OF DISCRETIONARY ACTIVITIES AIMED AT PROVIDING INFORMATION AND DIRECT SERVICES REGARDING TECHNOLOGY ASSISTANCE TO INDIVIDUALS WITH DISABILITIES, PARENTS, SERVICE PROVIDERS, AND PROFESSIONALS. ONE ACTIVITY UNDER TITLE II WOULD ESTABLISH A NATIONAL INFORMATION AND REFERRAL NETWORK WHICH WILL ENSURE THAT INDIVIDUALS IN ALL STATES HAVE ACCESS TO ASSISTIVE TECHNOLOGY DEVICES AND SERVICES. THE INFORMATION NETWORK WILL MAINTAIN INFORMATION RELEVANT TO ALL DISABILITIES, AGES AND ENVIRONMENTS AND WILL ASSIST STATES IN IMPLEMENTING STATEWIDE INFORMATION SYSTEMS.

TITLE II ALSO AUTHORIZES TRAINING GRANTS TO ELIGIBLE PERSONNEL SUCH AS TEACHERS, EMPLOYERS, AND SERVICE PROVIDERS SO THAT THEY HAVE A COMPLETE KNOWLEDGE IN THE TECHNIQUES AND PROCEDURES IN USING AND MAINTAINING ASSISTIVE TECHNOLOGY DEVICES. TECHNOLOGY IS USELESS TO PEOPLE WITH DISABILITIES IF NO ONE CAN TEACH THEM HOW TO USE, MAINTAIN OR UPGRADE THEIR EQUIPMENT.

FINALLY, TITLE II WILL PROVIDE DEMONSTRATION PROJECTS IN THREE AREAS: ESTABLISHING MODEL SERVICE DELIVERY SYSTEMS, FUNDING RESEARCH AND DEVELOPMENT PROJECTS, AND ESTABLISHING A DIRECT LOAN PROGRAM FOR INDIVIDUALS WITH DISABILITIES WHO NEED TECHNOLOGY-RELATED ASSISTANCE AND CAN FIND NO OTHER FUNDING SOURCES TO OBTAIN SUCH ASSISTANCE.

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THE PURPOSE OF THIS HEARING IS FOR US TO FIND OUT WHAT CHANGES OR IMPROVEMENTS NEED TO BE MADE TO H.R. 4904. CHAIRMAN OWENS, CONGRESSMAN JEFFORDS AND I ARE ALL ORIGINAL COSPONSORS OF THIS BILL AND BELIEVE IT WILL GET ASSISTIVE TECHNOLOGY DEVICES AND SERVICES TO INDIVIDUALS WITH DISABILITIES. HOWEVER, WE WILL HAVE ONLY ONE CHANCE TO PASS A TECHNOLOGY BILL THAT WILL SERVE INDIVIDUALS WITH DISABILITIES AND THIS SUBCOMMITTEE WANTS TO MAKE SURE THAT H.R. 4904 IS THAT BILL. I WELCOME ALL OF YOU TODAY AND LOOK FORWARD TO YOUR TESTIMONY AND ANY SUGGESTIONS OR PROPOSALS THAT WILL IMPROVE THIS BILL.